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THE IRON AGE

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JUNE 2, 1938

ESTABLISHED 1855 Vol. 141, No. 22

The Fable of the Owl and the Mice

THIS week, I am borrowing a fable from the celebrated French author, La Fontaine, because it so clearly reflects a present-day situation.

La Fontaine lived and wrote in the 17th century, several hundred years before such modern social philosophers and reformers as Jim Farley, Harry Hopkins and Supreme Kourt Justice Black were born. Yet La Fontaine's fable of the owl and the mice seems inspired with a prophetic knowledge of things to come and especially of some of the things that have come to pass within the past few years.

According to La Fontaine, and his story is said to be based upon facts, there was once an owl that was forehanded in the matter of providing himself with a supply of his favorite food. This owl was rather an epicure and his favorite diet consisted of mice.

Being endowed with owlish wisdom, and several centuries ahead of his contemporaries, this owl conceived the idea of regularization or the elimination of cyclical hazards and fluctuations in the matter of mouse supply. He had observed that on some days, or rather nights, when he obtained his supply of mice, he was able to do better than on other nights. In fact, on some occasions, when he was above par in pep and eyesight, he was able to secure more mice than he could eat.

On the other hand, there were times when the mouse pickings were pretty slim either because of some slowing down in the natural faculties of the owl or of the speeding up of the natural faculties of the mouse family.

At first the owl endeavored to solve his problem by depositing the surplus carcasses of the mice in what corresponded to cold storage of that day, but his epicurean taste was not satisfied with the rather mediocre results obtained thereby.

He liked his mice alive and not from cold storage. So he conceived the brilliant idea of keeping them in this condition, but subject to his command and incapable of running away. This was done by biting off their feet and then fattening them by bringing them plenty of food.

The mice, of course, no longer had the ability to scurry about and provide for themselves, nor indeed had they the inclination, being happy to have their wants so well satisfied. And the owl, in turn, had plenty of dependent and helpless mice at his disposal when he needed them.

There is one technical flaw, as I see it, in La Fontaine's fable. The owl did not need to bite off the feet of the mice. He could have made them just as helpless by the more painless method of removing their ambition. We live and learn!

J. H. VanDeventer

Structural Welding Progress in

IT was only about 10 years ago that the first all-welded buildings and bridges of considerable size were erected in the United States of America, and a couple of years later also in European countries and in Germany. Within this short period structural welding has become a well-established practice in almost every industrial country. There can be little doubt as to the technical, economical and aesthetic advantages of welded construction if carried out to expert design and by well-trained engineers.

Structural welding in Germany was still in the first stages of its infancy when the writer's article was published in these columns.[1] In those years the mere fact of erecting a building or a bridge by welding instead of riveting attracted attention. Since then, structural welding has passed from its infancy into another stage of development which may be called the stage of efficiency. Welding of steel structures is no longer done for the sake of experiments but only if and when the welded structure can reasonably be expected to be cheaper and better than a riveted or bolted one.

OUTSTANDING results of large-scale research—especially in connection with problems of fatigue—and their influence on weld design are outlined in this first of a series of three articles. The welding of buildings and of railroad and highway bridges will be discussed by Mr. Bondy in forthcoming issues.

Design for Welding Studied

As regards the height of buildings and the span of bridges the United States is certainly far ahead of any European country. On the other hand in Europe, and especially in Germany, great care has been taken to develop the design of welded structures, going into the smallest details of welded joints which for a long time have been neglected. Extensive research has been going on for a number of years especially in connection with the problems of fatigue.

The following notes are intended to illustrate recent developments, not by compiling a complete list of rigid structures which already number many hundreds and perhaps thousands, but by discussing some of the outstanding results of large-scale research and their influence on welded design. Extensive practical experience was laid down in condensed form in the new German regulations for welded plate girder bridges which will be compared in some respects with the American specifications issued in 1936.

It is also proposed to give particulars of structural welding practice in workshop and on site, dealing with some outstanding changes in the design of welded structures of extraordinary dimensions, discussing also the economic aspects.

Increase in Structural Welding

First of all, some significant figures relating to structural welding development in Germany. While in 1930 the first all-welded *railroad* bridge of the German State Railways with a span of only 33 ft. was erected near Münster, Westphalia, there are at present more than 150 all-welded railroad plate girder bridges in service up to 177 ft. single span and 1770 ft. total length. For all-welded *highway* bridges the present record is held by a single span of 338 ft. and a total length of 3300 ft.

All the above figures refer to the *plate girder* type of bridges only. As regards *truss* bridges there are none of all-welded construction to be found in Germany for reasons which will be discussed later. But it is significant that a number of all-welded truss

[1] O. Bondy, THE IRON AGE, April 2, 1931.

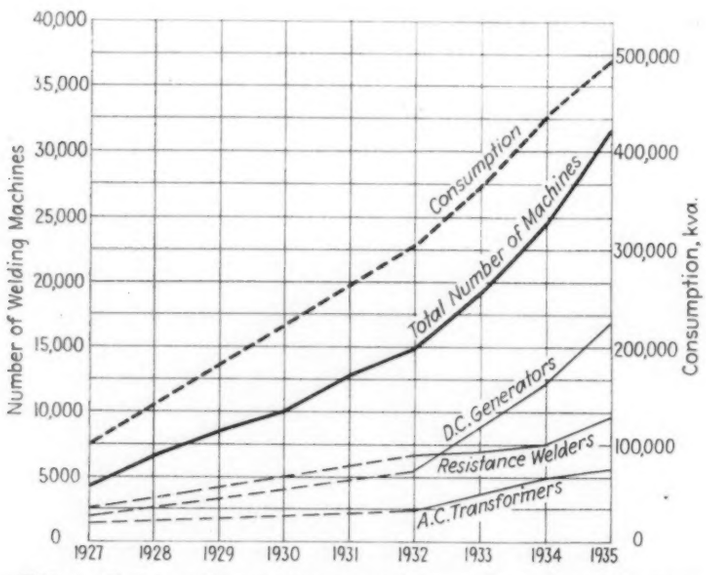

FIG. 1—Electric welding development in Germany (International Congress at Scheveningen, Holland, 1936).

Germany

Part I—Research and Design

bridges of considerable span have been erected in many other countries, an admirable start having been made in the United States in 1928 with the famous Chicopee Falls, Mass., bridge.

Another indication of the increase in structural welding may be found in the diagrams of Fig. 1. It also gives the proportion of the numbers of a.c. and d.c. welders in Germany which is probably quite different from that in other countries owing mainly to the proportion of bare wire welding as compared with the use of heavily-coated electrodes.

Fatigue Factor Included in German Regulations

In the early stages of structural welding the problems of *fatigue* resistance were given little attention. It was not until 1934 that the regulations of the German State Railways were made to include a fatigue factor not depending on the span of the bridge but on the ratio between the minimum and the maximum member force. According to that ratio and to the number of trains per day these so-called γ-factors were laid down and some of them are shown in Table 1. These figures show that in the most unfavorable cases of alternative stresses the factor γ means increase of the calculated load by 30 per cent with the usual mild steel St 37, while this increase goes up to 94 per cent with the so-called high tensile steel St 52.[2]

This factor γ has nothing whatever to do with the impact allowance which must always be included in calculating structures exposed to movable loads. Although the γ-factors cover the influence of repeated stresses they do not take into account the different liability to fatigue cracks in joints of

[2] "B. E." Regulations of the German State Railways, 3rd edition, June, 1936.

[3] O. Kommerell, Regulations for all-welded plate girder railway bridges, Berlin, 1936.

[4] Specifications for Welded Highway and Railroad Bridges, American Welding Society, 1936.

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By DIPL.-ING. O. BONDY

Consulting Engineer, London, England

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different shape. With the publication of the latest German regulations for welded plate girder bridges[3] the α-factors were introduced to cover the difference in shape, dimensions, type of weld, conditions of surface, etc., for a given welded joint. To calculate the necessary cross section of a girder exposed to bending the following equation may thus be used:

$$\sigma = \frac{\gamma}{\alpha} \cdot \frac{\text{max. } M}{W} \leqq \sigma_p$$

σ ..... working stress

σ_p ..... permissible working stress

M ..... bending moment

W ..... section modulus

The α-factors as well as the γ-factors are to be taken from tables included in the regulations, with the result that the working stress in a member or in a welded joint may be compared directly with the permissible stress in the parent material or in the weld respectively. The American figures are based on a minimum allowable yield point of base material of 33,000 lb. per sq. in. (14.8 tons per sq. in.), and on 18,000 lb. per sq. in. (8.0 tons per sq. in.) to be the basic allowable tension under the applicable general specifications. Incidentally, these figures are very near to those of the regulations in other countries, especially in Great Britain and Germany, and allow for a fair comparison between unit stresses for welds.

Permissible Weld Stresses Compared

As regards the permissible stresses in the weld itself it is interesting to compare the German figures with those contained in the American specifications as recently published.[4] The respective figures for butt welds are shown in the accompanying Table 2, including also some other countries. The percentages given may even be considered to be factors of confidence, so far as they indicate the value of the butt weld as compared with the parent material. Of course there are

Range of Stresses	Ratio min S/ max S	Structural Steel St 37 (23·5 tons per sq in Tensile Strength)	High Tensile Steel St 52 (33 tons per sq.in Tensile Strength)		
			more than 25 trains a day		Up to 25 trains a day Tension or Compression
			max S, Tension	max S, Compr.	
	-1·0	1·30	1·944	1·944	1·50
	-0·8	1·24	1·789	1·755	1·40
	-0·6	1·18	1·633	1·566	1·30
	-0·4	1·12	1·478	1·378	1·20
	-0·2	1·06	1·322	1·189	1·10
	0	1·00	1·167	1·000	1·00
	+0·2	1·00	1·012	1·00	1·00
	+0·5		1·00		
	+1·0				

TABLE 1—Fatigue Factor "γ", according to the BE-Regulations, German State Railways.

TABLE 2—Comparison of Permissible Unit Stresses in Butt Welds.

Country	Year	% of Parent Metal Tension	Compr.	Shear	Tons per Sq. In. Tension	Compr.	Shear
U.S.A., Bridges	1936	89	89	67	7.1	7.1	5.4
Germany, Buildings (DIN 4100)	1934	75	85	65	..	..	..
Highway Bridges (DIN 4101)	1937	80	100	65	..	..	..
Austria	1934	75	90	65	..	..	..
Great Britain	1937	100	100	75 / 62.5	8.0	8.0	6.0 plate girder webs / 5.0 other butt w.
(London County Council)							
Australia	1933	..	..	..	7.0	7.0	5.6
Switzerland	1935	70	100	57	..	..	..
Czechoslovakia	1932	..	..	..	5.1	7.0	4.4
Hungary	1933	..	..	..	5.4	7.3	3.2
Belgium	1934	80	100	..	..	..	..

TABLE 3—Quantities of Steel Structures Erected for the German State Railways, 1934-1936.

Quantities in Tons		1934	1935	1936	1937
Mild Steel St. 37	Bridges	30,000	31,000	39,000	21,800
	Buildings	10,000	25,000	11,000	10,300
H.T. Steel St. 52	Bridges	3,600	7,600	7,200	1,820
	Total	43,600	63,600	57,200	33,900

German State Railways: Quantities of Steel Structures O.B. 1937

many other influences which ought to be taken into account in making a direct comparison.

Fatigue Tests on Large Specimens

For about four years extensive fatigue research was carried out in Germany on large welded joints[5] and their results are incorporated in the new German regulations. It was found to be of outstanding importance that the fatigue tests should be carried out with specimens of considerable size, so as to approach as far as possible conditions in practical service. Swinging bridges of nearly 50-ft. span were installed for this purpose. These were truss bridges with a rotating tester installed in the center of the upper chords of the bridge and the vibrations were produced by two eccentric masses rotating in opposite directions. The test pieces themselves were 8 ft. 2½ in. long. The natural frequency of the two bridges installed at Dresden and Berlin was higher than the frequency during testing, the latter being 4.0 to 4.2 Hertz, to avoid any dangerous synchronization. The scheme of dynamic loading is shown in Fig. 2 indicating the alternating component stress of ±2.5 tons per sq. in. superimposed on a steady component stress of 7.6 tons per sq. in. in the test piece. The swinging bridges were working day and night. By an electric device there was an automatic standstill as soon as the test piece broke. Most of the test pieces did not withstand more than 2 millions of cycles which is generally considered an ample limit for endurance tests on structures. Supposing that 100 trains pass over a bridge within 24 hours the number of 2 millions of maximum stress cycles would only be reached after

2,000,000 : (365 . 100) = 55 years of service

Also for other reasons it may be assumed that with an endurance strength based on 2 millions of cycles we are quite on the safe side.

Influence of Test Results

Only a few of the most important *results* should be pointed out, at least to show their influence on modern *structural design*. Peak stresses are to be avoided. Sudden change of section brings the endurance strength to a minimum. Fatigue failure occurs suddenly without any previous warning, especially at places of abrupt change of section. Butt welds are by far more efficient from the point of view of fatigue than fillet welds. What is called "strengthening" of a butt welded joint often means weakening, as shown in Fig. 3. Under similar testing conditions the simple V-butt weld showed itself by 30 per cent stronger against repeated stresses than a similar butt weld "strengthened" by welded-on splice-plates on both sides. Similar experience has also been had in practice, and the designer should always keep in mind that the simple butt weld with a continuous flow of stresses is the ideal type of joint.[6]

Endurance strength also depends largely on the proportions and the shape of the member itself. Welded joints of same static tensile strength are often quite different as regards their fatigue qualities. Butt welds should be thoroughly welded at the root and pre-welded with thinner electrodes. Machined surface may improve fatigue values of butt welds from 11.4 to 15.2 tons per sq. in., that is by 33 per cent. Butt welds obliquely to direction of stress proved useful and their fatigue values increased from 11.4 to 14.0 tons per sq. in.

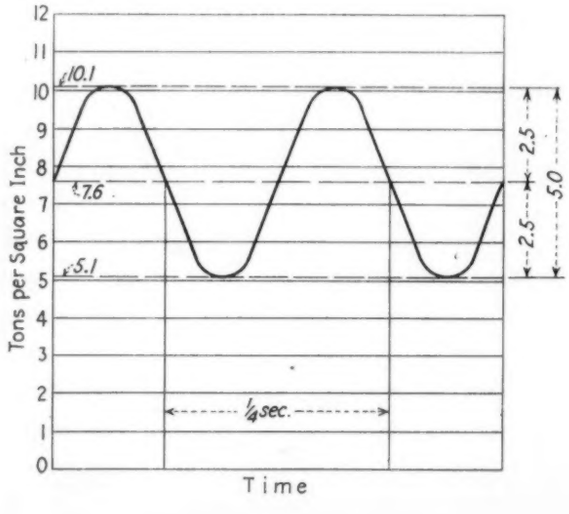


FIG. 2—Swinging bridge, scheme of loading.

[5] Dauerfestigkeitsversuche mit Schweissverbindungen, Berlin, 1935.

[6] O. Bondy, Paper before the Institution of Welding Engineers, The Welding Industry, London, March, 1935.

Side fillets: good elongation of the weld metal of not less than 15 per cent is essential. Deep penetration may act as undercutting and should be avoided. Continuous fillets gave better fatigue values than intermittent welds (in the new bridge regulations no intermittent fillet welds are permitted, not even for stiffeners).

End fillets: concave section fillets are by far better than the usual convex welds. Undercutting is dangerous as it acts transversely to the direction of stress. Covered electrodes prove useful if a concave weld face is secured.

Quality of Parent Metal Affects Fatigue Strength

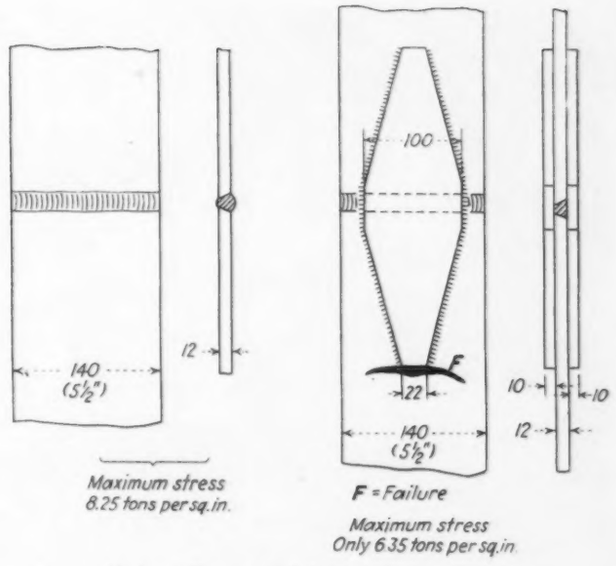
Moreover, many valuable results were obtained regarding other influences on the fatigue strength of the joint which, apart from the design of the joint, also largely depends on the quality of the parent material, of the electrodes and on the welding procedure. Both electric arc and gas welding were tried in this connection. Regarding the German high tensile steel St 52 the results were less satisfactory. Substantial advantage in using high tensile steels only begins with higher values of initial stress.

The quantities of steel structures erected for the German State Railways during the last three years are shown in Table 3. These figures show that the proportion of high tensile steel St 52 is only in the neighborhood of about 12 per cent of the whole consumption. But it appears that previous difficulties with St. 52 have been overcome and many of the largest welded bridges in Germany contain a very great proportion of high tensile steel.

[1] O. Graf, Stahlbau, Berlin, Jan. 15, 1937.

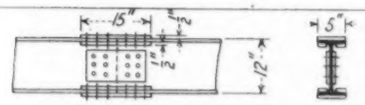
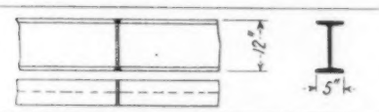
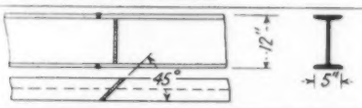
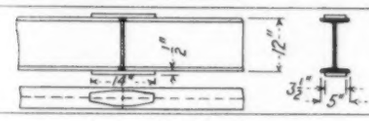
AT RIGHT

FIG. 3 — Butt weld, with and without splice plate. (O. Graf).



BELOW

FIG. 4—Fatigue strength of various types of girder connections. (O. Graf).

Type of Joint	Method	Bending Endurance Limit, 2 millions reversals	
		Kg. per sq. mm.	Lb. per sq. in.
	Riveted	14	19,900
	Welded	16	22,800
	Welded	18	25,600
	Welded	11	15,700

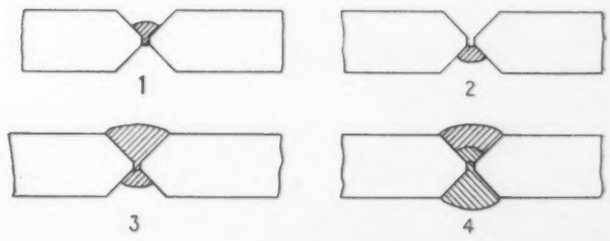
So-called "strengthened" butt weld has also been confirmed with series of tests on welded joints of rolled sections.[1] Generally the fatigue strength of welded plate girders may be assumed to be higher than that of riveted girders but one must not overlook the fact that the fatigue strength of welds even of ideal design is still much lower than that of the parent material itself. While with regard to static tests a 100 per cent quality welded joint has been achieved by the extraordinary progress made with electrodes and welding procedure, it is very doubtful whether similar progress can be expected regarding the improvement of fatigue qualities of welded joints.

Correct Welding Procedure

Much care is also given to the correct procedure in carrying out the welding itself. For heavy double V-butt welds a satisfactory sequence of work was adopted as shown in Fig. 5. After the first layer has been carried out with thorough penetration by thin electrodes the plate girder is turned by means of rotary jigs and the root of the weld is cut out before proceeding with the welding process.

(CONTINUED ON PAGE 75)

FIG. 5 — Sequence of work with heavy butt welds.



Magnetic

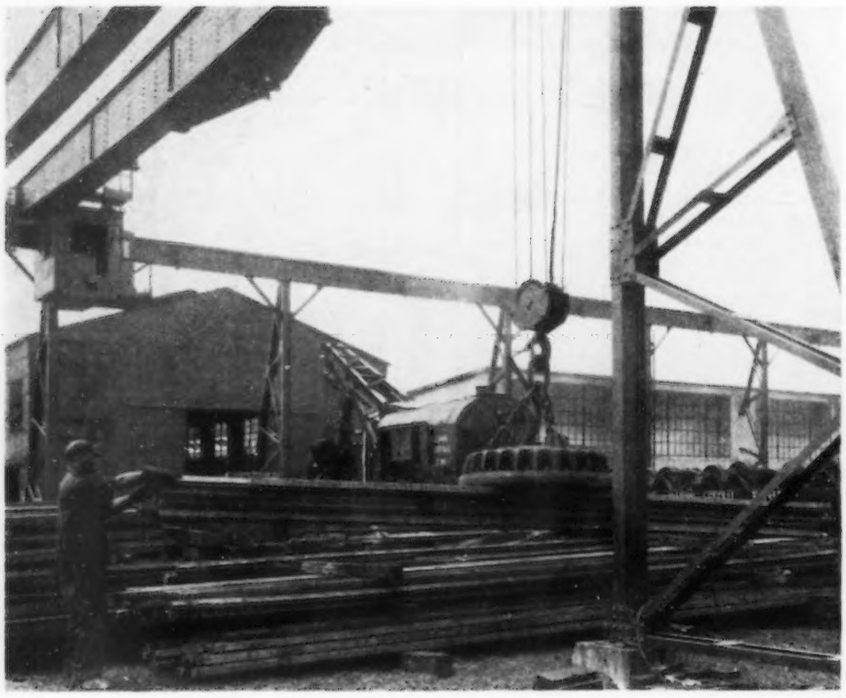


FIG. 1—Cutler-Hammer magnet operating from a Whiting crane in a forging plant yard.

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CHAPTER 29 of a Series on Materials Handling Methods and Equipment.

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THERE are three very important functions of magnetism in modern handling work; the first involving straight lifting operations, the second involving conveying operations, and the third involving the separation of ferrous from non-ferrous materials. Each of these functions is but another variation of the fundamental characteristic of magnetism; the ability to attract and hold iron in any shape or form. This characteristic in itself defines the natural limitations of magnetism in handling work; it is effective only when the materials to be handled are of iron, or contain iron in substantial quantities. These limitations, however, are such that its usefulness applies in many important fields of industry.

One principle permeates the entire range of uses. It is this: When a current of electricity is passed through a coil of wire or of conductor-ribbon surrounding a mass of relatively soft iron or steel, that mass becomes endowed, while the current is flowing, with the property of attracting and holding ferrous substances; but when the current ceases flowing this property of attraction leaves the mass inert. As a consequence, the attraction property may be held under constant control.

In the first category of handling (lifting) this idea of control is fully as important as the actual property of attraction. For, it would be of little advantage in handling work to have a device which picks things up, if one could not also make that device drop the things picked up, at will. Thus, a so-called "permanent" magnet (or device which retains its magnetic qualities indefinitely) would not be of much use as a handling device.

In the construction of lifting magnets, therefore, the mass of metal which becomes energized, or "magnetized" by the flow of electrical current is selected equally for its characteristics of acquiring and losing magnetic powers, that is, 1—the ability to quickly take and hold a maximum value of magnetic flux while the energizing current is flowing, and 2—the ability to give up or dissipate that flux quickly and completely when the energizing current is interrupted.

The lifting magnet is essentially a device depending from a crane hoist hook, used for the purpose of picking

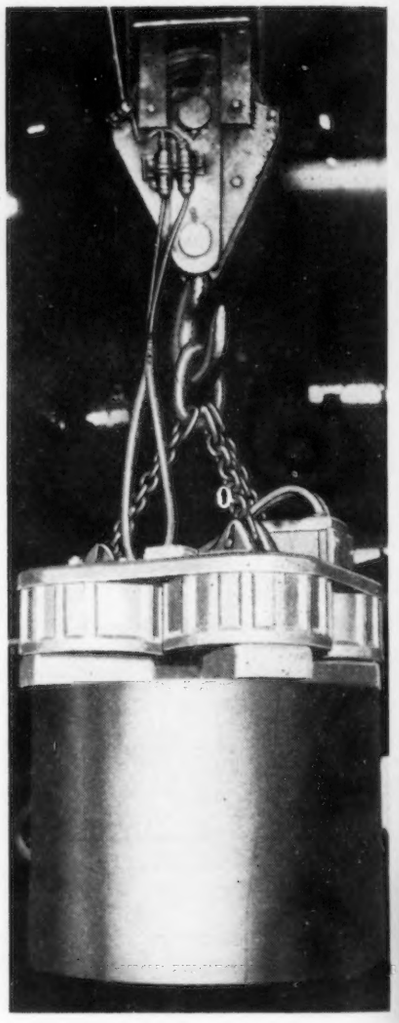


FIG. 2—New type four-pole Electric Controller & Mfg. Co. magnet for handling coils of finished strip steel.

up ferrous materials in shapes which are difficult to handle in any other way. For instance, twisted iron or steel turnings, or chips from any sort of machine tool, form a mass which is exceptionally hard to handle. The lifting magnet, however, will pick up huge quantities with ease, for the magnetism flows from turning to turning, or from chip to chip until the quantity adhering to the magnet and to other portions of the mass is equivalent in

Handling and Separation

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

total weight to the effective pull exercised by the magnet throughout the mass. Again, the cropped ends of hot steel billets make nasty articles to handle. They are usually dropped into a cooling pit filled with quantities of steam from the cooling water spray, they are very irregular in shape and hence hard to grab, and they are usually fairly heavy. But a lifting magnet dropped into the pit at the end of a hoist hook locates a number of these ends unerringly, picks them up and pulls them through the cooling spray, and holds them safely until they are transferred to the railway car which is to receive them. There, at the turn of a switch in the control cab of the crane hoist, the energizing current is interrupted, and the ends drop off the magnet immediately.

FIG. 3—Ohio Electric Mfg. Co. magnet handling three 8,000 lb. coils of strip steel at once.

Or, take the newest use to which the steel industry is putting lifting magnets—the handling of coils of strip steel from the hot mill. These coils are loosely wound; the ends are free, for the coils are not bound in any way. And, the edges of the strip may have all sorts of "camber," so that neither the top nor bottom surfaces of the coil when in an up-ended position present a truly flat surface. Yet the lifting magnet will lift one, two, three or four of these hard-to-handle coils with the greatest of ease; picking them up instantly, holding them dependably during transfer, and setting them down as gently as required, anywhere within reach of the crane hook; all as carefully as though they were precious gems.

No matter what the size or shape of the article to be handled, provided only that it is of ferrous metal and not heavier than the handling capacity of the magnet used, the lifting magnet will instantly pick it up, carry it safely and deposit it where required. Even bulky, odd-shaped and cumbersome machines may be handled economically by the lifting magnet, whereas with any other handling method a long-winded adjustment of carefully rigged slings or other special picking-up tackle adds time and expense to the handling operation.

Lifting magnets are commonly made in circular form in sizes varying from

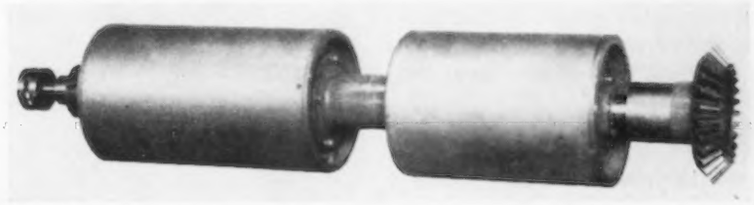
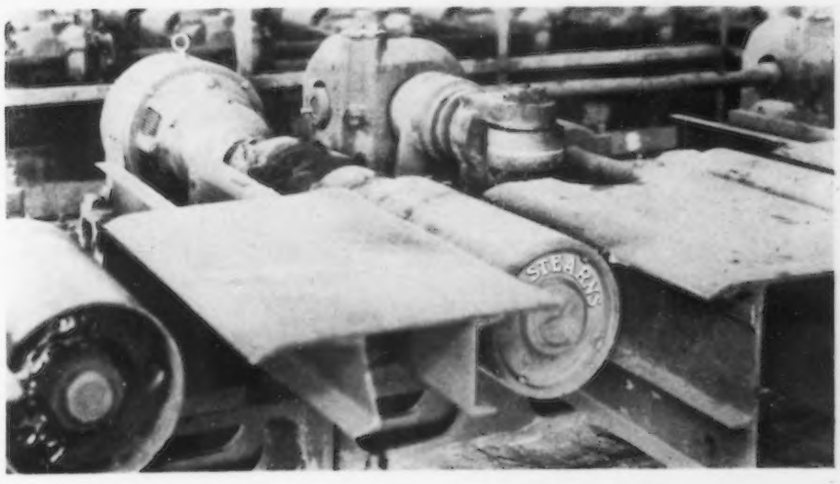
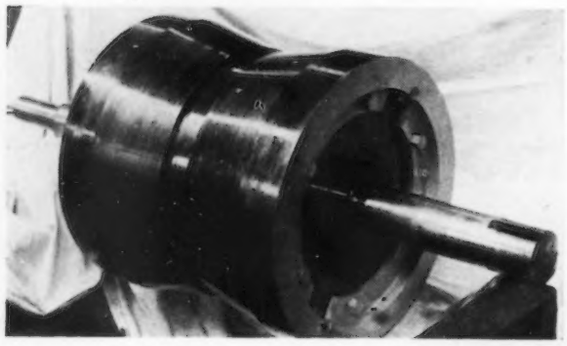


FIG. 4—Stearns Magnetic Mfg. Co. high duty magnetic skelp roll.

BELOW

FIG. 5—Typical magnetic skelp conveyor, with Stearns roll set at a slight skew.





AT LEFT

FIG. 6—Dings Magnetic Separator Co. magnetic pipe roll.

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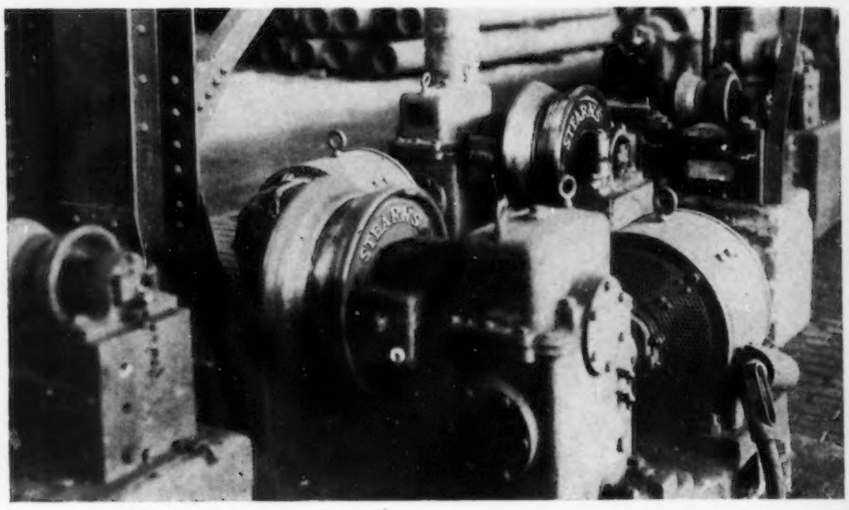
BELOW

FIG. 7—Two Stearns magnetic pipe rolls set up for conveying pipe or tubes.



12 inches or less up to 65 inches in diameter. The largest sizes have lifting capacities up to 65,000 pounds weight of single billet or slab, 30,000 pounds of single ingot or multiple coils of strip steel, 1800 pounds of broken scrap or 1200 pounds of steel turnings, on all day service. Rectangular magnets are also available to handle rails, rods and structural shapes, where a narrow width but long length of magnet gives a larger area of contact with the material to be handled.

Temperature or weather conditions make no difference in the handling abilities of a properly designed and constructed lifting magnet. It will work equally well in temperatures below zero or almost up to the melting point of iron; in dry, dusty atmospheres, and below water. In fact, lifting magnets are frequently used to recover ferrous metal parts from the submerged cargoes of sunken vessels.

Fig. 1 shows a Cutler-Hammer circular magnet operating from a Whiting crane in the yard of a middle western forging plant. The bundle of square rods it is picking up weighs close to half a ton. In Fig. 2 the Electric Controller & Mfg. Co. introduces a new type of lifting magnet especially designed to handle coils of finished strip steel. In this magnet the mass of the magnetized metal is not concentrated over the hole in the coil, as in the usual circular magnets, but is placed at four points in the circumference; two south poles and two north poles. Hence the attractive force comes directly over the coils of the metal instead of over the hole in the coil. A single coil of 55 inches outside diameter and weighing 22,000 pounds may be handled easily with this magnet.

On the other hand the conventional circular magnet as shown in Fig. 3 (an Ohio Electric Mfg. Co. product) handles three to four separate coils of strip either directly from the hot mill and therefore unbound; or finished, and therefore tightly wound and bound, at one time, each coil weighing up to 8000 pounds.

Typical illustrations of lifting magnets handling scrap metal were shown in the issues of THE IRON AGE dated May 13, 1937, page 55; June 10, 1937, page 46, and page 47; Dec. 30, 1937, page 37.

Steel mills in particular have found magnetic conveying an economical aid to production. Two general forms of equipment are available, each a variation of the other and based on the same general principle. In the first, certain of the cylindrical rolls of a roller conveyor system are magnetized (see Fig. 4, a view of a high duty Stearns Magnetic Mfg. Co. skelp roll). These magnetized rolls are power-driven, and in turning, the surfaces attract the sheets or bars placed on the conveyor and move them forward over the adjacent non-magnetic rolls. A view of a typical magnetic skelp conveyor is shown in Fig. 5, as installed in a large steel mill. The Stearns magnetic roll is here set at a slight angle to the non-magnetic rolls so that the skelp-plates are not only pulled forward over the table, but likewise are moved toward the top of the table where the vertically-set guide rollers keep them moving on in a straight line.

In its second form the magnetic roll is shaped with a concave face as shown in Fig. 6 (a Dings Magnetic Separator Co. roll for pipe or tube conveying purposes). The action of such a pipe roll is exactly the same as with a sheet roll. It should be noted, however, that pipe may be handled both over and under the rolls, since the magnetic force is ample to hold up the weight of the pipe section passing the roll at any given time. In Fig. 7 two similar Stearns magnetic pipe rolls are shown set in a line of idler rolls. It is also of interest to note that such rolls will carry pipe, tubes or round rods up an incline as well as along a level stretch.

For all forms of magnetic rolls the electric current supply must be D. C., either 110 or 220 volts. Where only alternating current is available, the current must be converted to direct current before it can be used on the rolls. Generally, all the rolls in a line consume about 500 watts each, and the current is on continuously except for the last one or two rolls at the discharge end of the conveyor line. Here, in order to discharge the pipe being handled, the current is periodically interrupted, generally by means of a limit switch actuated by the pipe itself when it has reached the discharge position. At this point, the current going off, the magnetic rolls instantly lose their powers of attraction, and the pipe if carried on top of the rolls continues to roll forward and off the conveyor, or, if held under the rolls, is simply dropped at once.

Most magnetic rolls are built in either 15-in. or 18-in. widths, with the concave trough so designed as to handle pipe from 6 in. to 24 in. in diam-

eter equally well. The magnetic attraction insures positive forward motion, since the frictional contact between the pipe and the roller is greater than with ordinary power-driven non-magnetic rollers.

The magnetic attraction of such rollers is clearly shown in the shop photograph reproduced as Fig. 8. Here two Dings magnetized rollers are holding up a length of steel pipe on which five men are seated, weighing all told, with the pipe, about 850 lb.

A common use for such rolls, with the pipe held under the rolls, is in galvanizing work. The process is extraordinarily simple. One end of the pipe is lifted from the galvanizing tank and applied to the under side of the nearest magnetic roll. The roll immediately picks up the pipe and carries it forward to still other rolls, up an incline, so that the spelter runs out of the pipe back into the tank. Having run far enough to drain quite thoroughly, and also to cool, the pipe end hits a limit switch, throwing off the energizing current in the rolls. Thereupon the pipe drops from the rolls to a storage pile below.

Two forms of magnetic separation are in widespread use—dry and wet. The purpose in each case is to separate ferrous particles from a quantity of loose material, the bulk of which may or may not have ferrous characteristics. In Fig. 9 a Dings magnetic separator pulley is shown installed on a 36-in. wide inclined belt conveyor in a foundry. The sand from the shake-out passes over this belt, and at the top is thrown off in a shower, as shown, onto a pile below. The magnetic particles contained within this sand, however, cling to the belt as it turns around the pulley until such time as the belt passes beyond the magnetic influence of the pulley. Then these particles, known variously as "chills," "gaggers," "risers," "shot," etc., drop away from the belt and into the inclined metal chute shown. The non-ferrous material is screened and is then fit for re-use as molding sand. Such magnetic pulleys are of immense value in separating iron and steel parts out of any flow of loose material which can be passed over a belt conveyor.

The wet separation process is used in ore concentration work. Crushed ore is fed into a tank filled with water, through which a belt hanging loosely a short distance above the bottom of the tank, is running. Over the belt and fitting closely its natural sag, a long magnet is held. As the crushed ore and water move with the belt from the intake end of the tank forward the magnet pulls the ferrous particles up to the belt, where they cling. Into a first discharge hopper the "tailings" are dropped; into a second discharge hopper the "middlings," or finer non-ferrous particles disappear. Finally, over a third discharge hopper the magnetic influence stops, and here the bulk of the ferrous particles which have all along clung to the moving belt, drop off as "concentrates." Better than 98 per cent of the magnetite or of other minerals having similar magnetic susceptibility may thus be taken out of the crushed ore so handled, in one operation.

ABOVE

FIG. 8—The holding power of two Dings magnetic pipe rolls is sufficient to carry the weight of a section of steel pipe with five men seated thereon.

o o o

AT RIGHT

FIG. 9—A Dings magnetic pulley on a 36 in. wide sand belt conveyor separates out all the ferrous particles in the shake-out sand.

Coupling Sales to Research

By R. E. ZIMMERMAN
Vice-President, United States Steel Corp. of Delaware

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THE first half of this American Iron and Steel Institute paper, which appeared last week, described the growing interdependence of industry and science during the past decade, and sketched the current status of market research and the relationship between sales and research.

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ANY one who is interested in antiques realizes that an attained age of 30 years is practically without significance. Not so in the case of automobiles, where research and development have created markets and fostered sales practically to the limit of purchasing power. The American chemical industry has grown and prospered because year after year it has developed and offered to the trade new and improved products, the so-called "test tube babies," many of them "children of the depression." This is a prolific family, responsible for a tremendous volume of business. Surely no one will think that sales and research did not go hand in hand in making commercial progress with all of the items mentioned above.

Now alertness on the part of suppliers of basic materials is particularly advisable because of the fact that new developments in scores of fabricating industries inevitably reflect demands for unusual properties or characteristics in capital goods. Nineteenth century merchandise will not fill twentieth century specifications.

The good steel rails of the gay nineties which performed outstanding service in their day, would fall far short of the requirements of modern railroading, just as the deep drawing sheets of 1908, if subject to the common stamping and forming operations of 1938 would be the despair of the pressman. No one would think of using the early oil well casings or string of drilling tools in holes that go to depths of two miles or more.

In these latter days certain steels must operate satisfactorily at high temperatures, others at many degrees below zero; various grades must harden uniformly upon heat treatment, permit of welding by half a dozen methods, and upon specification be highly resistant to corrosion, impact, creep, abrasion, and fatigue. Also, surface perfection and such properties as damping capacity, magnetic susceptibility, and conductance are properties that receive detailed attention.

A most interesting feature of the situation in which we now operate is the circumstance that research in one industry is stimulated by research in many others. It must be so if maximum progress is to be made, because new outlets must balance new inlets. Moreover, such a condition makes the joint between sales and research in any one industry operate effectively without expensive lubrication.

Suppose, for instance, that the research efforts of suppliers and users did not have much in common. An automobile built on the pattern of a 1938 model, but with the steels procurable in 1908, finished with the best paints then available, equipped with smooth tires guaranteed for 1500 miles, and dependent upon the gasoline of 30 years ago for its operation, would be a sad spectacle in comparison with what we have today. That the situation is not as depicted is due to the close cooperation between producers and customers, in the interest of developing a progressively better finished article from progressively better component parts—and by the same token, wider markets for all.

In the case of a steel company, a goodly proportion of the work of its technical research organization is properly of the kind which is directed toward the already recognized or highly probable needs of its consuming trade. These needs are known to the technologist, either through his direct contact with the field or through the eyes of the sales department and its bureau of market research.

Problems in this category, which deal primarily with products, are dear to the heart of the salesman, because any reasonable solution of them at once paves the way for his regular commercial activities. Here the bond between sales and research is quite direct, or the backlash may be said to be negligible, because the market is in position to welcome a new or improved product, if procurable at a price which is economically sound. Some exploitation may be required, of course, to realize the full measure of benefit from a development, but the atmosphere itself is favorable from the start.

Processes Improved

Another main section of research activity is concerned with the development or improvement of processes, rather than products. Here the bond between sales and research may not seem, at first glance, to be so close, but it exists, nevertheless, even though it may be a flexible coupling. Process research, if successful, affects products in either or both of two ways that are of interest to the sales department, first by a reduction in costs and second by a better control and general raising of quality.

A study of the equilibrium between slag and liquid steel in the open hearth furnace, or the subsequent deoxidation of the metal by one agent or another, may seem to be far removed from the sales manager's office, yet these features have a most important bearing upon the cost and physical properties of the product he sells. Research on mold wash, ingot stools, refractories, pyrometry, control of furnace atmosphere, methods of heat treatment, and the like, is largely an intra-plant or company affair, but in the long run all of this kind of activity must inevitably lead up to sales through the cost sheets and final acceptance tests.

Moreover, technical service of particular value to customers is often made possible by the process research conducted by the supplier, because in many instances the customer heat treats, deforms, pickles, or otherwise

handles the steel through operations similar to those employed by the steel maker. The thought just expressed will bear elaboration in the following paragraphs.

In terms of service there is another linkage between sales and research, subsidiary to the main coupling perhaps, but never outstripped by it in potential usefulness. Considerable emphasis has been placed on the fact that the technological activities of a steel company are continually developing essential information about its products and the treatments which affect their properties.

Technical Advice Available

Much of this information is used regularly by metallurgists and other experts in contact with the trade—sales engineers or sales metallurgists they may be called—whose business it is to supply technical advice and assistance in the selection and use of their company's products. These men rely upon the homework of the organization for their support. They draw upon the research facilities for aid in solving difficult problems and are generally reinforced by the data and findings of the research laboratory. This activity is a regularly constituted adjunct to sales.

Now the thought arises, why not expose the entire sales personnel to as much of this same educational material as can be readily assimilated and used? The confidence engendered by a thorough knowledge of his product is certainly not a handicap to the salesman, nor is he at a disadvantage in knowing the whys and wherefores of recent technical developments.

This is not to say that each conversation with a prospective customer should start with a discussion of the iron-carbon equilibrium diagram or a dissertation on rates of transformation. It is to say, however, that a sales representative should never be in an embarrassed position because his fund of metallurgical information is insufficient to carry him creditably through an enlightened conversation with any of those with whom he makes regular contacts. Research and sales can profitably indulge in considerable intimacy with that thought in mind.

There is still another phase of research which comes within the scope of this discussion even though it does not receive its main impetus from either the urgent requirements of today or the readily recognized needs of tomorrow. It is concerned with the possibilities of the day after tomorrow. Thus it may be called long range research, which in no wise unfits it for mention in the same breath with sales, for we have seen that sales is deeply interested in the future. In fact a sales organization devotes considerable effort to reading the signs of the times and to interpreting the auspices. So with perfect propriety we couple sales to long range research.

The distinctions and classifications which have been used in this paper as a matter of convenience and for purposes of discussion must not be looked upon as tight and rigid fences, separating research from research. In practice there is always overlapping and penetration. The motives which guide the work on nearby and distant problems respectively, are much the same, but the degree of freedom is considerably higher in the case of the latter.

There the research worker attempts to look the whole way to the horizon, and without binding himself to current products and practices, sets out to develop things which at present are unfamiliar. Imagination and vision are called into play. A considerable amount of time may be spent in the scientific exploration of new fields so that trustworthy underlying information may be on hand to support subsequent steps, for there are relatively many of them to be taken.

Future Markets Considered

Along the way however, as soon as the path seems to be leading toward the development of certain new products, the various possibilities are weighed and discussed with the commercial division so that parts of the course may be charted in the direction of the best apparent prospects. This procedure does not necessarily halt the march toward the still distant objectives, for it is often advisable to follow through and develop something beyond the markets of the day.

In other words the steel industry need not and does not spend all of its efforts in simply keeping up with the demands of the trade; it is justified in developing products for which a market must be cultivated, so that it may thus contribute, in its own name, to industrial progress. The exhilaration of a good promotional campaign, with a new story to tell the prospective customer, is an experience always welcomed by the sales department. Its special facilities, including advertising, market research, and sales promotion, are always ready to lend a hand.

We believe that present methods of producing, rolling, and finishing steel are rather ingenious and efficient, but organized research is studying radically different methods in the interest of finding something better. Almost every operation in the steel industry is subject to improvement year by year, due to the workings of science within and without its confines, but at longer intervals substantial changes are wrought. It is hardly necessary to add that these wider swings in technique are of profound interest to those who sell the products affected by them.

Sufficient has been said to indicate that sales and research have much in common and that one influences the other throughout the whole gamut of activities from raw materials to technical sales service. The urge to find larger markets and new uses for basic materials is a wholesome characteristic of the industries engaged in producing those essential commodities.

Metal Competition Keen

In the realm of metals alone, steel has many active companions, as may be seen by a glance at copper, zinc, nickel aluminum, magnesium and various others. Recently even silver has been much in the news, serving notice of its ambition to reach beyond the confines of coinage, jewelry, tableware and loving cups, and become an industrial metal of many new applications. In making markets for all of these companion metals, research, experimental development, promotion, sales and technical service have gone hand in hand to reach the levels now attained.

Neither the urge nor the inevitable competition between and among the metals and their alloys seems to be abating. Thus the need for continued collaboration by all agencies which influence the market position of any product is quite apparent. From the standpoint of the direct customer and the public, one happy circumstance of all this effort is that it makes available a choice of notably improved and economical materials for the production of finished goods to be used by the consuming trade.

In this era of industrial progress through which we are passing there are still many tasks to be performed, many opportunities for building and marketing better products for the future. The steel industry, as a supplier of one of mankind's most useful commodities, is undertaking the solution of its share of the problems, so that the world may move forward with steel.

Current Progress in Finishing

AMONG the recent announcements of the manufacturers, we find apparatus for facilitating buffing and polishing operations, aids for plating, and a number of items relating to spray coating, including a water curtain spray booth with unique features. A number of new finishes are also described.

AFTER using it on its own production for a year, the *Shakespeare Products Co.*, Kalamazoo, Mich., has begun to market an automatic buffing machine for small, round parts. Chief among the features stressed is that work is taken straight into the buffing wheel with equal pressure on all critical surfaces, since the wheel quickly shapes itself to the part, allowing the buffing of plastics as well as soft metal parts. Using automatic collet chucks and air ejection, production ranges from 300 to 1000 pieces per hr. and even higher for color buffing.

The unit is designed as an attachment for a buffing lathe. It incorporates a ball bearing mounted spindle driven by chain from a 1/6-hp. geared head motor, and a single and double-lobed cam for reciprocating the entire head in and out from the wheel. With spindle speed of 360 r.p.m., reciprocations are 12 and 24 per min., respectively. Cams may be selected by a knob. Collet capacity is ⅞ in. for the expanding type and ⅝ in. for the contracting, and parts up to 5 in. in diameter may be buffed. Set-up time is approximately 15 min.

Straight Line Buffing Machine

The *Packer Machine Co.*, Meriden, Conn., has recently developed a straight line conveyor type buffing machine for finishing a variety of shapes and sizes of parts. The machine can be furnished with any number of wheelheads, which are the Packer No. 6500 universal type, with adjustments for setting the wheels at any angle from horizontal to vertical. The heads are arranged with spring balance plates, compensating for variations in thickness of the work. Motor size is optional and drive may be either direct or by V-belts.

The conveyor chain is driven by a variable speed unit. The carriers have ball bearing rollers and travel on a substantial track. All important moving parts of the machine are ball bearing equipped and the working parts are shielded against abrasive materials.

Sisalin Buffing Wheels

For intermediate operations between polishing and buffing, sisal fiber is

ABOVE

A STRAIGHT infeed is featured in the Shakespeare automatic buffing attachment for buffing lathes. Production: 5 to 24 pieces per min.

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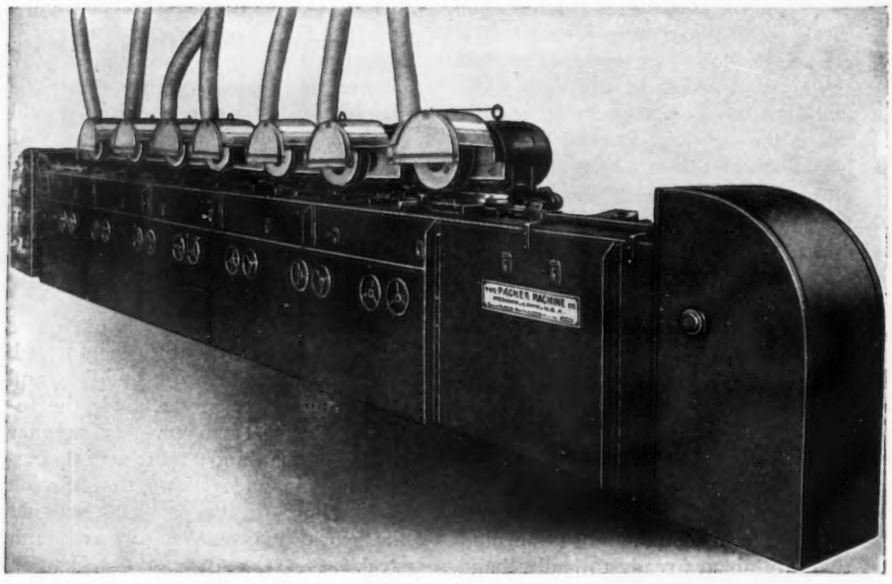
AT LEFT

THE Packer No. 2 straight line conveyor type polishing and buffing machine shown is 30½ ft. long, but can be furnished in any length and any number of automatic wheelheads.



Equipment

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By FRANK J. OLIVER
Associate Editor, The Iron Age

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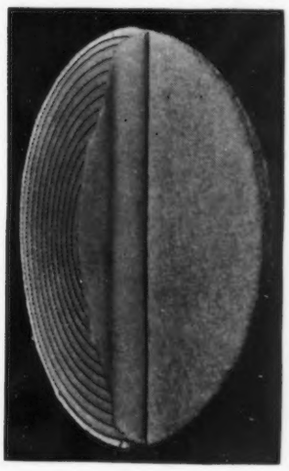
used in place of cotton buff in a new patented wheel brought out by the *Hanson - VanWinkle - Munning Co.*, Matawan, N. J. The sisal, which is a material used in the manufacture of rope and twine, is employed in a specially prepared mat form, interleaved with muslin and the resultant product sewed together. Sisalin sections are recommended for finishing carbon steel, stainless steel, brass, copper and aluminum. Generally, compounds are limited to tripoli, stainless steel rouge and emery paste. When a comparatively high finish is required, dry compositions are used.

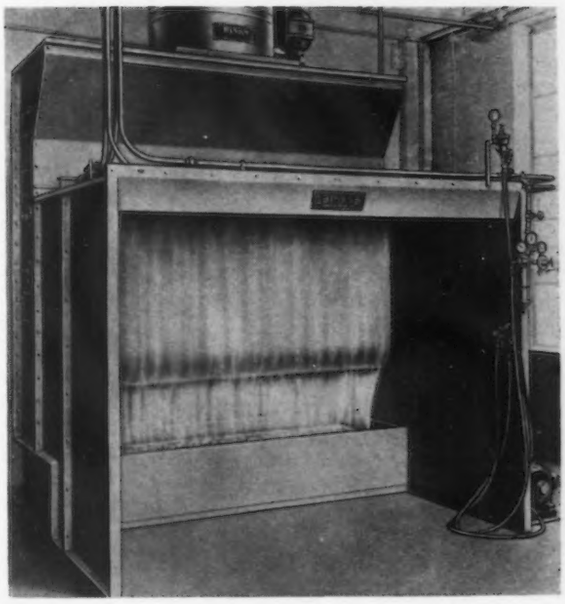


AT LEFT

SISAL fiber in mat form is sewed between muslin layers in this new Hanson-VanWinkle-Munning buffing wheel for intermediate operations between polishing and buffing.

AT RIGHT

THE water curtain extends the full width of the spray booth in the Binks Dynaprecipitor unit, which has self-cleaning features throughout.



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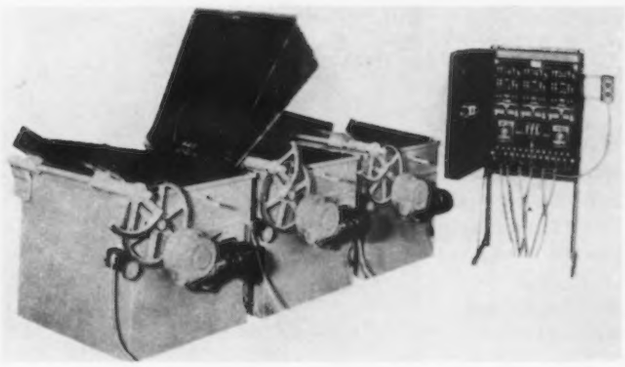

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THREE automatic hopper type rinse tanks used in connection with batch type barrel plating. The panel provides remote control. This is another Hanson-VanWinkle-Munning development.

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Polishing Cements

M. P. Iding Disc Grinding Compound Co., Inc., of Milwaukee, is marketing two new kinds of polishing cements. Idilite is an aluminum oxide abrasive made in two types, whereas Idilon is a silicon carbide abrasive particularly adapted for polishing grey iron. Type ET Idilite has etched grains which possess high capillarity and sharp cutting qualities. The type NT or non-etched grains possess longer wearing qualities and produce much brighter finishes when used with cements. These grains can be furnished in any size or type.

Hopper Feed for Barrel Plating

Hanson - VanWinkle - Munning Co. has also developed hopper equipment for the automatic handling of barrel plating work. In one installation, the work, previously sand rolled, is dropped into the hopper of the first tank and given a cold water rinse. It then proceeds from one hopper to another, through a cleaner, rinse, acid dip, rinse and thence to the plating barrel. After plating, the work is handled in much the same manner until it is dropped into a Mercil centrifugal dryer. The lifting of the hoppers can be effected either by hand or by electric hoist. The hoppers are made in either steel or monel metal and the capacity varies from 50 to 150 lb. For work requiring a special treatment arrangements can be made to reciprocate the hoppers continuously through 6 in. travel. Automatic lifting and lowering of loads can also be had through individual motor drives.

Carbonate Remover

Cyanide plating solutions have a tendency to build up sodium carbonate, which affects the quality of

the deposits and lowers efficiencies. To counteract this tendency, the Electroplating Chemicals division of *E. I. du Pont de Nemours & Co.* has introduced the Du Pont carbonate remover. A calcium sulphate compound of slight solubility, it is a precipitation agent which can be maintained in excess at all times, permitting disposal of the carbonate as it is formed. A bulletin prepared by the company presents a complete analysis of the chemical reactions involved as well as practical considerations.

Test for Zinc Coatings

For determining the thickness of electroplated zinc coatings by the Hull & Strausser method, *Hanson-Van-Winkle-Munning Co.* is marketing a dropping test set, consisting of a stand, burrette tube and integral reservoir. Stopcocks are adjusted so that the test solution issues at the rate of 100 drops per min. The cleaned specimen is placed at 45 deg. and the time the first drop touches the plate until the base metal appears is measured by stopwatch. Each second represents a thickness of deposit of 0.00001 in. Accuracy by this method is within 10 per cent of the actual thickness.

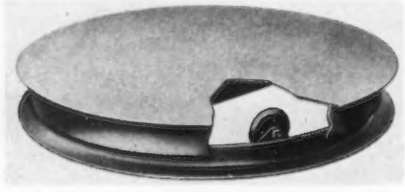
New Type Spray Booth

A new principle in the continuous cleaning of paint fumes from spray booths, has been developed by the *Binks Mfg. Co.,* 3114 Carroll Avenue, Chicago, and is available in the new Dynaprecipitor unit. A feature of this unit is a stainless steel water curtain extending the entire width of the spray cabinet. Paint pigments striking this curtain are washed down into a collecting pan, in which a special chemical causes the pigments to rise to the surface where they may be skimmed and reclaimed. Fumes are also drawn up behind the water curtain by the draft from a 2-hp. fan at the top. This laden air passes through a set of stainless steel precipitor plates where the pigment is deposited. Water under 12-lb. pressure is sprayed against these plates from top and bottom, cleaning their surfaces so that they do not become gummy and clogged. Above the precipitor plates is a set of eliminator plates, the duty of which is to take the moisture from the air before it is released from the stack.

The efficiency of this cleaning system is claimed to be 99 per cent. Health and safety are aided considerably, and the hazard of fire is greatly reduced. A 3 hp. motor is utilized for pumping water from the collection pan to the sprays, and the water may be used over and over. Evaporation loss is estimated by Binks' engineers at ¼ per cent of the volume of water circulated by the pump, or an average cost for water of 2c. a day. The reclaimed pigments may be remulled and used in a paint for odd jobs.

Spray Coater for Flat Objects

For finishing embossed, stamped and other types of flat surfaces that do not lend themselves to roll or brush coating, the *Willard C. Beach Air Brush Co.,* Harrison, N. J., is offering its automatic Spracoater. It consists of a rigid framework into which is built a slideably operated carriage on which is mounted one or more spray guns. The carriage crosses in a reciprocating motion over the line of travel of the product to be coated. Mechanical means of controlling the spray intermittently at the end of each stroke effects economy of finishing materials over hand spray methods. The work is carried through on a conveyor. Exhaust air is handled the same way as in a hand spray booth.



A LINE of roller type turntables for spray booths is offered by Binks Mfg. Co., Chicago, in sizes from 18 to 60 in. diameter. Legs can be furnished for use with floor type booths.

THE Gat spray gun, a product of the Eclipse Air Brush Co., Inc., Newark, N. J., is made of heat-treated Dowmetal and weighs only 23 oz. complete. It can be operated with either internal or external atomization, under low pressure, with width of spray adjustable from 1 to 36 in.

Spray Guns

Binks Mfg. Co., Chicago, has announced a number of accessories for spray guns, including the Thor Model 7E-1 spray gun for heavy materials, illustrated. Where greater capacity than ordinary is required for cleaning compressed air, Binks is offering two or three oil and water extractors hooked up in series. The two-unit combination handles 50 c.f.m. and the three-unit, 75 c.f.m. For capacities up to 200 c.f.m., the company recommends its No. 540 main line extractor with individual extractors at each gun outlet. On the paint line the new No. 255 strainer serves as the last cleaning agent to remove any foreign matter which might have been picked up in the hose or circulating pipes. It has a 250-mesh screen and is attached directly to the gun.

HEAVY materials, such as asphalt paint and sound deadener compounds, can be handled with the Thor model 7E-1 spray gun, made by Binks Mfg. Co. Of the internal atomization type, it has a ¾-in. material inlet.

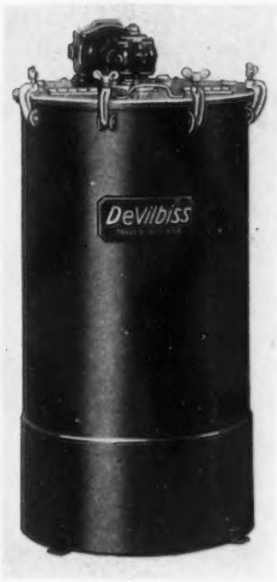
Binks is also marketing a special twin air and material hose joined by the Siameez web. The paint tube is made of a special composition that is not harmed by the usual solvents in paints and lacquer. Each hose is reinforced by braids of strong cord, and the tough covers, red and black, are made of paint resisting rubber compound.

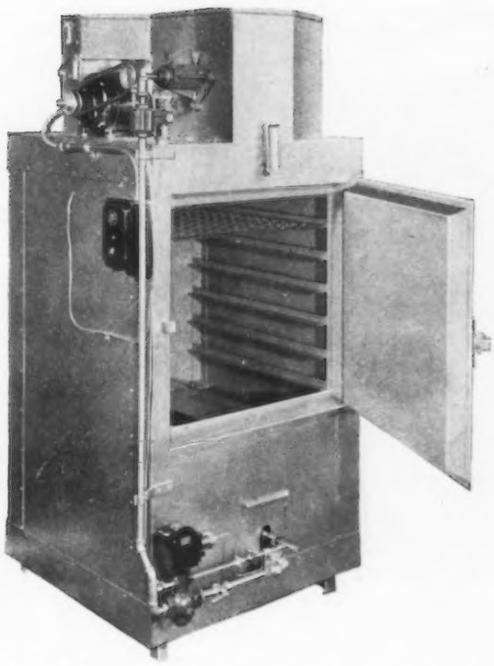
Hinged Lid Mixing Tank

A new type of mixing tank with hinged lid is announced by the *De Vil-*

BELOW

THIS DeVilbiss mixing tank for lacquer and synthetic enamel has a gasket seal on the hinged portion of the lid.





THE Herrington & Randall cabinet type oven is suitable for baking, drying and heat treating, with temperatures up to 700 deg. F. and forced air circulation.

biss Co., Toledo. Available in 30, 60 and 120-gal. capacities, the sealed type QM tanks provide an inert atmosphere for mixing material without oxidization. Tanks are straight sided shells inserted in a foot ring. Covers are 5/16 in. steel, with the hinged portion made pressure tight by clamps and a solvent resistant gasket, protected by a pouring baffle. Each tank is equipped with an explosion-proof motor, and the degree of agitation provided is adequate for mixture of heavy bodied pigments.

Cabinet Type Oven

A cabinet type baking oven with positive motor driven recirculating and exhaust system has been announced by *Herrington & Randall, Inc.*, Detroit. It is intended for use where total production is small or for testing work. The net baking space varies from a 2-ft. cube to as great as 4 x 4 x 3 ft. This type of oven is adapted to all types of baking or drying or heat treating up to temperatures of 700 deg. F. By using linings of alloy steels, it may be used for temperatures as much as 1000 deg. The thickness of the insulation ranges from 2 to 6 in., depending on the operating temperature and length of cycle specified.

The cabinet oven is suitable for heating by gas, electricity or steam. If desired, it may be arranged for natural ventilation.

New Finishes

Two new types of finishes have been placed on the market by the *American Concrete & Steel Pipe Co.*, of South Gate, Calif. A metallic coating for steel structures uses the same inert resin binder as in other Amercoat solutions and with a metallic pigment of aluminum, copper or lead forms a sheet of perceptible thickness. Furthermore, the metallic coating is tightly bonded to the metal it protects by a corrosion resistant metal prime, which it is said will stick even to galvanized sheet. Both solutions are applied with ordinary sprav guns. It is further claimed that the material will not become brittle nor check nor crack.

Amercoat rapid dry coating is a corrosion resistant material similar to Amercoat enamel and plastic except that it is not particularly designed also to resist erosion and abrasion as the latter are. The rapid dry coating is intended for immediate application over Amercoat concrete prime or metal or wood prime, and its coverage is 200 to 250 sq. ft. per gal. It is insoluble in salt water or in petroleum derivatives, and will resist acids and alkalis up to 20 per cent concentration.

Sherwin-Williams Co., Cleveland, has recently developed two new series of black and white baking enamels. There are four types in the black production series, A, B, C, and D. Enamel A bakes to a rich gloss and enamel B has a somewhat lower gloss; enamel C can be air dried or baked and provides the sharpest gloss, while enamel D has a dull finish. These enamels are formulated to apply equally well by spray, floco or dip methods. The KEM appliance white enamels are offered in both high and intermediate baking types and are said to give color stability under baking temperatures higher than usually feasible for white enamels. Excellent adhesion and hardness, with high resistance to impact, marring and wear are claimed, as well as freedom from discoloration. Application is said to be easy, and its exceptional build and opacity make possible a full rich finish.

A. S. Low, of Austin, Discusses Welding

DETROIT.—Development of technique for welding of structures in recent industrial buildings was discussed at the May meeting, which concluded the season program of the Detroit section of the American Welding Society. Albert S. Low, vice-president and chief engineer of the Austin Co., Cleveland, credited with many significant contributions to engineering and construction practice, described shop and field methods employed in fabricating and erecting the Austin "tree-form" column and saw-tooth roof members.

In the shop, Mr. Low said, permanent steel jigs are used for jobs where production is great enough to warrant the investment in such equipment. Where production is small, clamps are used, or the members are bolted together for tack welding, followed by seam welding with either portable or automatic equipment. Members shipped to the field have ends left bare for further welding.

Advantages attached to these newer structural methods include noiseless erection; extra rigidity which makes it possible to pick up an entire truss with a hook instead of a sling or spreaders; the elimination of much incidental bracing; weight savings ranging from two to 30 per cent; simplification of details, such as gusset plates; ease of reinforcement and alteration, and the greater possibility of developing and commercializing new forms of construction, according to Mr. Low.

Acme Installs New Equipment for Tool Treatment

By ROBERT G. BINGHAM
Western Editor, The Iron Age

A HEAT treating department, which in less than a year, has established the enviable record of having reduced field failures from more than 10 per cent to less than ½ of 1 per cent, is one of the features of the Archer Avenue, Chicago, plant of the Acme Steel Co.

Working chiefly with the parts and dies for the company's line of hand tools and equipment for sealing, stretching and snipping steel box strapping, this department was made necessary because of the absolute control over material required by the particular work at hand, and the apparent inability of many commercial heat treaters to produce the desired results. Rejects often amounted to 25 per cent of the work sent out.

In order to obtain lightness combined with strength a rather unusual situation has developed at Acme in that the materials entering into the construction of these hand tools are designed up to their ultimate strength, no allowance for safety being made.

When questioned as to their ability to work to such high limits, the heads of the department stated that no materials in the lower sorbitic and pearlitic ranges are used, that tool steels are used in the troositic and martensitic range, and alloys in the upper sorbitic to troositic range. Since they know the fatigue value and endurance limit of materials in the troositic to martensitic range, and the values of the materials themselves from a minimum of 2 per cent to a maximum of 20 per cent, it was decided to eliminate the extra weight made necessary by figuring a safety factor for the tool parts.

The management of this department at Acme, which was started last August, believes in working objectively toward its goal, and takes nothing for granted. When such close limits are being adhered to, mistakes are fatal and make it impossible to use the steel for its intended purpose. It was learned that the absolute control necessary could best be obtained by the use of the controlled atmosphere furnace, and a Leeds-Northrup Vapo-Carb hump furnace was purchased, in which all hardening and carburizing is now done.

Experiments have shown that through the use of this furnace, from 10 to 40 per cent more ductility and hardness is obtained from nickel alloys than ever before.

The first step in the heat treating process is the placing of the tools and dies which are to be treated in a nichrome basket, which is fitted with nichrome trays and hangers, upon which the various parts are arranged so as to benefit the most from the heat treatment.

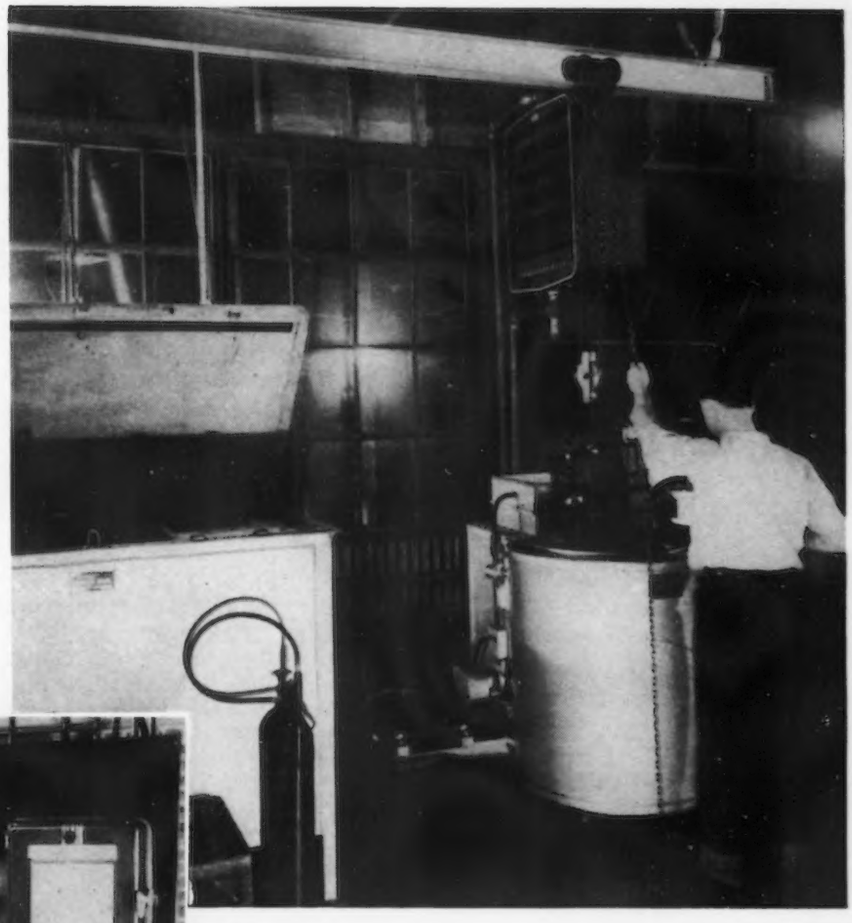
Accompanying each basket load of parts is a complete case history, including a record of all operations from beginning to end of the heat treatment, such as the temperature of the various furnaces used, time within each, temper data, etc. These sheets and the charts from the recording apparatus are filed by the number of the parts, so that in case of rejects, complaints or duplicate orders, the exact procedure is easily determined.

AN Acme Steelstrap tool, which stretches, seals and cuts the strap, in actual use.

Equipment includes two Lindberg tempering furnaces, one box and one round, with maximum temperatures of 1200 and 1250 deg. respectively, the latter being used occasionally for preheating, a Micromax recording system, quenching tanks, and the Vapo-Carb hump furnace mentioned above.

Placed side by side in a line, the quenching tanks and furnaces are all served by an overhead monorail conveyor, especially designed to accommodate with ease the nichrome baskets containing the parts.

Before going into the first furnace, the parts are given a 15-min. soaking in an oakite solution maintained at 200 deg., which removes the oil brought in from the machine shop. A 150-deg. water bath then removes the oakite remaining on the parts, which, when dry and clean, are placed in the furnace.



ABOVE

TANK at left contains oil quench, which is cooled by unit heater at upper center. The Nichrome basket for parts and monorail conveyor are pictured.

o o o

AT LEFT

MICROMAX recording apparatus.

The tank containing the oil for quenching is connected by pipes to a large unit heater mounted near the ceiling of the room. When the temperature of the oil exceeds the 115 to 120-deg. range which is considered desirable the fluid is pumped through the unit heater, which cools the oil to the proper temperature and recirculates the entire contents of the tank.

After the quench, this oil is removed from the parts by immersion in the oakite bath once more, the parts then being tempered before final inspection.

Inspection consists of Rockwell hardness tests, the taking of fractures to determine ductility and grain size and, when carburized, depth of case. In some cases miscroscopic examination is made. Certain batches of parts are 100 per cent examined, while others are inspected by representative samples. In addition, every piece of steel entering the plant is thoroughly inspected as to chemical, physical and metallurgical properties. Certain pieces are even run through a test heat-treatment in order to determine exactly the result of the planned procedure on the metal. If any one of the above tests fails, the entire order of steel is rejected.

That the purpose for which this department was established has been achieved is evident when it is seen that a lightweight box strap sealer which at one time weighed 4 lb. has been trimmed to 1¾ lb. by redesigning and choice of materials, and that by the same method, a stretching device on another tool now tips the scales at 10 lb. against 38 lb. previously.

The department is planning to add soon a pot hardening furnace which will contain neutral salts, with accompanying recording apparatus for small rush jobs that require close control but no carburization.

Casting Sanitary Ware In Permanent Molds

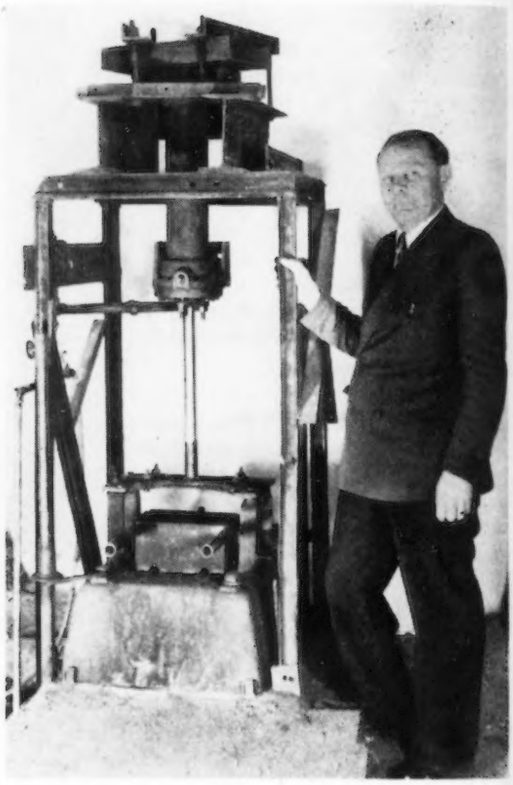


FIG. 2—Typical installation of the permanent mold machine with mold closed in the pouring position.

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THE use of permanent molds for casting small gray iron parts on a production basis has been fairly well established. At the present time the bulk of the castings produced in permanent molds consists of these small castings used in the automotive, electrical and kindred industries.

The production of larger castings, while it has received some attention from foundrymen, has not advanced as rapidly as has the production of small parts. For this reason it is interesting to note the features embodied in a machine for casting sanitary ware which has been developed and patented by Matthew Wagner, of M. Wagner, Inc., Glendale, Calif.

The machine produces one casting per cycle and is used to cast 16 x 20 in. sinks and 20 x 24 x 13 in. wash trays. The principal construction features of the machine are illustrated in Fig. 1.

The machine is of semi-steel construction and has three main sections: the cope (a), the drag (b), and the core (c). Movement of the cope is provided through a hydraulic hoist, and a gear and ratchet mechanism is employed to lower and raise the core. The drag is mounted permanently on foundation supports and does not move. Vents, not shown in the drawing, are bored through the cope at strategic points to carry off the gases.

Preparatory to the casting operation, the mold sections are heated to about 300 deg. Fahr. and coated with a refractory material. The sections are then closed and molten metal is introduced into the mold through the gate. The casting is given sufficient time to solidify, then the core is lowered and the cope raised. Simultaneously with the raising of the cope, to which the casting adheres, a plate mounted on wheels is pushed beneath the casting and a few light taps of a hammer on the gate head causes the casting to drop on the plate. Following the removal of the plate the mold sections are closed and the cycle repeated. Two men are said to be able to turn out 30 castings an hour, or an average of one every 2 min. According to experience reported to date, the life of each mold is estimated to be about 10,000 pours.

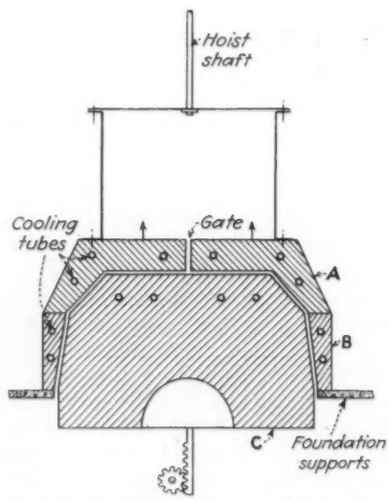


FIG. 1—Construction details of the Wagner permanent mold machine. A coolant circulates under pressure through the passages indicated in the sketch.

One of the problems encountered in producing castings by this method is that of regulating the setting and cooling cycle to avoid having the casting contract over the core and shatter. Once the proper interval has been determined, and the other factors kept constant, casting becomes a routine matter.

Although the surface of castings produced in this manner is said to be minus the burnt-on sand common to the sand cast product, it is necessary to sandblast the castings to remove the mold coating and other dirt which is picked up between the mold and the enameling ovens.

We the Communists

o o o

By JAMES A. ROWAN
News Editor, The Iron Age

o o o

WHETHER the Communist party is part owner of John L. Lewis' CIO and SWOC is considered by many folks as a matter for argument.

In some regions where the SWOC for almost two years has tried one way and another to bring all the steel workers into its fold, the possibility that the Communist Party has an important place on the list of SWOC stockholders is robustly denied.

At other points—where privation has made the industrial population less conservative and necessarily less discriminating as to who shall be its collective bargaining champion—the Communist link with the Lewis' labor unions is more easily discerned.

One city that has no doubts about the subject of Communism is Buffalo, N. Y., and the inquiring visitor who brings up the subject in that city shamefacedly realizes that he risks becoming a bore. Everybody seems to understand about Communism up there and at the Buffalo district's steel mill gates everybody seems to know about Lewis unions such as the SWOC. Both organizations have their admirers and supporters and if Buffalo has grown to regard them as one and the same thing—with an interlocking directorate—the SWOC has nobody to thank but itself.

In most industrial towns the SWOC thanks the Reds but also makes them use the back door even though there are cities where newspapermen politely stand when they find the chairs in the SWOC offices occupied mostly by writers from radical papers and magazines. But generally it is the back door and often the Communists have enough sense of social inferiority not to embarrass the SWOC leaders.

In Buffalo it is different. The Communists stand in the receiving line with the SWOC leaders and often nobody can tell who is who. Frequently the Communists have told Erie county what seems to be the truth about the SWOC partnership. Recently handbills given Buffalo district steel workers said:

"We must build and strengthen *our* SWOC union in Bethlehem Steel.

"We must attend all union meetings. We can win relief and jobs, provided we all work through the unemployment committee of the union.

"Get every individual and organization to send resolutions, letters and telegrams to *our* congressmen, demanding passage of the New Deal and social legislation.

"Build a people's Front against the sitdown of Wall Street.

"If you are not already a member, see your fellow worker, or come to the SWOC hall of the CIO, Ridge Road, Lackawanna, or at 158 Pearl Street, Buffalo. The only way to improve and overcome our present predicament is to join, attend and become real active in our union. See you every Wednesday at the Union Hall."

That the Bethlehem Steel workers in Lackawanna and at other points along the Niagara frontier have not responded in substantial numbers to the cheery invitation to "see you every Wednesday" is traced by some Buffalo observers to a man named Charles Doyle, the first SWOC organizer in the area who, by coincidence, was also a member of the Communist party. Mr. Doyle's standing among Buffalo "liberals" rests more on his accomplishments for that party than for anything else. Communism was Mr. Doyle's chosen career and when the organizing drive got under way with Doyle as its leader that made two strikes on the SWOC in its Buffalo venture.

So that the scoffer who didn't believe there were such folks as Communists could see, the foes of the SWOC noted somewhat vociferously that the Reds had (and have) their Erie county headquarters on the second floor of the Root Building, in downtown Buffalo, and that the SWOC headquarters was (and is) on the same floor and next door. There was nothing wrong in this since members of all political parties also use the same Buffalo streets and ride on the same railroads but the fact that the SWOC and Communist offices adjoined was a coincidence.

Yet it wasn't coincidences alone that so far has licked the SWOC in the Buffalo area. Rather it was ambition, Charles Doyle's ambition to be, among other things, a sub-regional director of the SWOC and ruler of that organization's affairs along what is known locally as the Niagara frontier. As Doyle's ambition, following months of hard work, rose to a fever heat the SWOC became interested but after a glance at the union books decided to write Doyle off as a loss to the movement. Boiled down to the essentials the SWOC local's books at 229 Ridge, Lackawanna, showed very few members and little cash money but these results were not ascertained without a great deal of wrestling with figures.

The SWOC local's books had become what is known in accounting circles as "scrambled." Figures from everywhere seemed to have alighted on the union's records. Telephone numbers, laundry bills, orders for groceries, license numbers and totals from expense accounts submitted by

union organizers seemed to have been jumbled together into a mass too formidable even for the SWOC's national auditing and bookkeeping department, which is ably and honestly operated by David J. MacDonald, the SWOC's clean cut young secretary-treasurer who has little stomach for the rough stuff of unionism.

About the only statistics of consequence not found in the comprehensive records of the Ridge Road local was the result of the March vote under Bethlehem Steel Lackawanna plant's Plan of Employee Representation. This, an independently-run election by a long established collective bargaining system, showed 85 per cent of eligible voters cast ballots for workers' representatives and in approval of that method of dealing with the steel company's management.

But the bungled books as a source of grief were nothing compared to the powerful and menacing opposition which the SWOC's widely advertised tie with the Communists threw against the Lewis union's drive to take over the labor movement in Buffalo. Here in Buffalo, at least, there was a united church and clergyman after clergyman warned his followers against "these Communists." Father Coughlin, however declining his power in other parts of the United States, has thousands of followers in the Buffalo area and their answer to the SWOC's pleas for union members and union dues has been a thunderous "No." Right Reverend Monsignor J. J. Nash, second highest ranking Catholic churchman in Buffalo (Bishop John A. Duffy is first), took up arms against this Communist threat and when this veteran of 50 years religious effort in that city speaks much of the Niagara frontier listens.

Priests like Father Glapinski of St. Hyacinthe's church, Ridge Road and Holland Avenue, Lackawanna, and Father Julius Zakany, D.D., of the Church of the Assumption also in that city, began tossing word bombs at the Communists and when the Protestant clergymen, very much in the minority in Buffalo, got into action, the field was strewn with the SWOC's hopes for an easy victory.

From Lackawanna (a Buffalo suburb) to Sparrows Point, Md., (a Baltimore suburb) where another large steel plant of Bethlehem Steel Corp. is located is a long jump in more ways than one but the results of the recent election of employee representatives seem to have been about the same at both places. The Sparrows Point employees' association claims that 85.5 per cent of the plant's workers last March voted their approval of the Bethlehem Plan of Employee Representation, which the SWOC has urged the National Labor Relations Board to abolish.

While the answer to the success of the Employee Representation Plan of collective bargaining at Sparrows Point seems to rest mainly in the system's many years of operation, during which the plant's workmen have grown familiar with it, a large man named Howard Buck, the Sparrows Point ERP chairman, seems to deserve some of the credit.

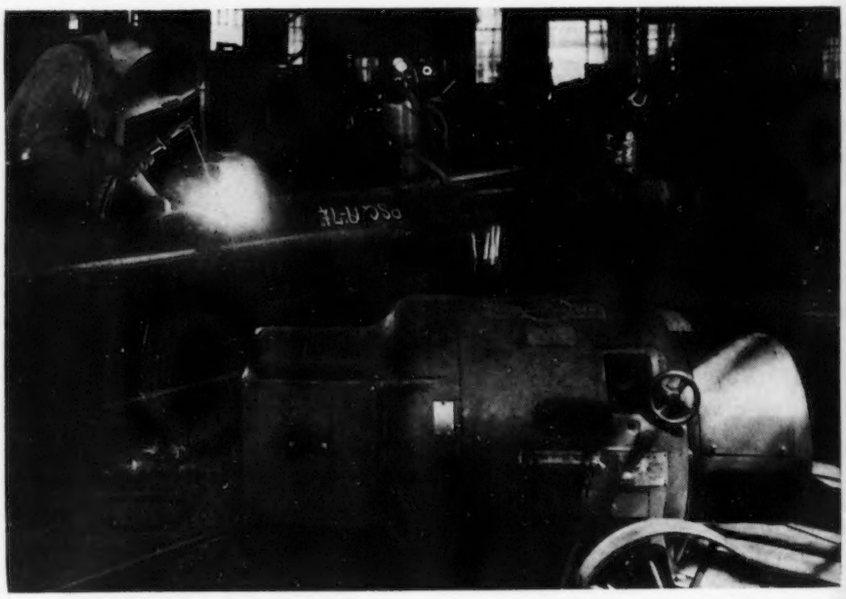
Mr. Buck is not a freshman or even a sophomore at the business of getting union members and keeping them on the rolls and persuading them to pay dues because he spent 16 years as a union organizer for the Amalgamated Association of Iron, Steel and Tin Workers, the same organization into which John L. Lewis and his lieutenants are trying to crowd the steel workers.

When Buck scratches his ear and hands down an opinion as to what the SWOC strategists are plotting in the way of breaking up the ERP, the rest of the boys listen because "Buck has been there and seen everything," having sat in himself on a great many such meetings with Mike Tighe, formerly the Amalgamated president, and many others. While Mr. Tighe likes to sit with a far-away look in his eyes describing how he "tied up most of the mills in the country back in such and such a year," Mr. Buck likes to tell of how he got religion and quit the Amalgamated.

"I come down here to get a few members at Sparrows Point and hell, I found the pay higher than in our signed mills, so I quit and took a job myself," Buck said. "There was nothing to fight over."

Over at Dundalk, a nearby town, and up and down the Patapsco River, Mr. Buck is a person of obvious power and consequence and the fact that many a peace loving Sparrows Point workman who likes his job (and even his boss) has escaped a broken head in battles with the SWOC dues collectors depends in part on Buck's resplendent pride in his job as head of the ERP.

While he himself has worked for 12 different steel companies, he says that having reached an age of discrimination and discretion, he dislikes "floaters" or workers who go from place to place in good times or bad. "It's the lack of 'floaters' that keeps labor trouble out of Sparrows Point," said Mr. Buck. "We're all family men down here," he said.



WELDING on a high pressure steam pipe line with a Westinghouse flexarc welder. This type of welding requires very careful and thorough workmanship.

Iron Quality as a Problem of the Steel Industry

o o o

By H. W. GRAHAM and H. K. WORK

General Manager and Manager of Research and Development respectively, Jones & Laughlin Steel Corp.

o o o

LAST week the authors reviewed the causes of variations in iron quality, presented data on the relationships between iron temperature in the runner and the composition of the iron, and described the influence of the physical condition of the furnace burden on quality. This concluding section of the American Iron and Steel Institute paper is concerned primarily with the effect of variable iron quality on steel quality.

o o o

NO sooner did Bessemer invent his process for steelmaking than the problem of iron quality confronted him. By sheer good fortune, the first iron on which he conducted his experiments was relatively low in phosphorus and fairly high in manganese, and so adapted for his converter. When he tried to demonstrate his process with other English irons which were higher in phosphorus, lower in silicon, and quite low in manganese, he failed completely. For two years Bessemer imported low-phosphorus, high-manganese Swedish iron for his steelmaking, until his ingenuity and Mushet's discovery of the necessity for manganese solved his problem.

Despite the early start on this matter, which is of great importance to all steel manufacturers, only a limited amount of work has been done. Merely to map out a course of investigation is far from simple. In the first place the term "steel quality" is all-embracing, including surface, rolling quality, chemical composition; cost, and physical properties too numerous to tabulate here. To correlate the variables in iron quality with a number of these would be a prodigious task.

In the second place, the operations of making, rolling, and finishing steel themselves have pronounced and varying effects on the quality of product. The difficulty of separating the effect of these factors from the more distant effects of variables in iron quality has discouraged much work. The set-up of the ordinary steel mill is such that it is practically impossible to make any type of quality determination on the steel (with the exception of chemical analysis) until it has been cast into ingots, heated in the soaking pits, rolled through the blooming and possibly bar, billet, slab, or rail mills. No one will pretend that these operations may not have a profound effect on the quality of the steel.

The first quality determination which may be made ordinarily is the yield from the blooming mill, or the surface of blooms or billets on the chipping beds. On any individual heat, however, these indices are generally of little help. Nevertheless, by grouping large series of heats, classifying and averaging them in terms of the variable being investigated, thereby eliminating the effect of changes in other variable, it is possible to arrive at an understanding of the effect of variations in a given constituent.

The effect of the principal elements in iron varies to a marked degree, depending on the steelmaking process in which the iron is used. Consequently, different specifications are used for the three main grades of iron employed in steelmaking. These vary from plant to plant. However, typical working specifications as used in our own plant are shown in Table I. The significance of these values cannot be over-emphasized, so they will be discussed in detail.

Carbon was not included in the above specifications, but usually runs from 3.5 to 4.5 per cent.

Silicon is of great importance in the Bessemer process, since it is the principal source of heat for the refining operation. Consequently, it must be held within reasonably narrow limits. In the open hearth process in the past silicon has been considered relatively unimportant. Recently, however, the situation has changed. With increased attention to slag-metal relationships, it has been found that greater attention must be paid to the silicon content of iron. This is particularly important in the manufacture of rimmed steel, since if silicon is high the steel may contain insufficient iron oxide to insure a satisfactory rimming action in the mold.

Steady changes have been taking place in the industry which tend to emphasize the importance of sulphur on steel quality. In 1937 nearly one-

half of the steel produced went into flat rolled products. With this trend in the direction of flat rolled products and the unfavorable influence of sulphur on surface quality, there is no question that greater study must be made of the control of this element.

Its effect on other products is equally important, although not always so much emphasized. Note its relation to the surface quality of seamless steel and rod-mill billets as shown in Tables II and III. The tables, expressing the effect of residual sulphur on the deviations from the normal amount of chipping necessary and the normal rejections due to defects, show a marked increase in both of these factors for the steel made from high-sulphur iron. The 3.4 per cent increase in rejections due to an increase of sulphur of 0.010 per cent (Table II) represents approximately 440 tons of steel.

Manganese is an important element in steelmaking. It is generally considered beneficial in iron for open hearth steel but detrimental, if too high, for Bessemer iron, particularly that used for Bessemer screw steel. The optimum value of manganese for Bessemer screw blowing is around 0.45 to 0.50 per cent, although there is some difference of opinion as to the exact limits. Increasing manganese is accompanied by a considerable loss of metal due to slopping in the converter. Furthermore, it is conducive to poor surface quality of the steel. The effect of manganese on surface quality[30] is shown in Table IV, which was compiled from data extending over approximately 100,000 tons of billets.

Phosphorus in iron for the basic open hearth is not considered important if it is not too high. When it is high the task of removing it increases the length of time on the heat and complicates slag problems. For the Bessemer process, however, phosphorus is highly significant. It is not removed in the acid Bessemer process; in fact it increases about 10 per cent due to loss of other elements. Consequently, because of its effect on the physical properties of steel, it is necessary to limit the maximum percentage in the iron.

The form of carbon is, of course, of no importance in hot metal. It has been remarked[31] that when the combined carbon in the hot metal (as determined from small test bars) exceeded 0.60 per cent, sheets made therefrom exhibited a scabby surface. No data were advanced in proof of this, and others have indicated that the amount of combined carbon in iron is a dependent variable associated with the amount of silicon present and other variables, such as the rate of cooling of the test piece. It is difficult to see what effect the combined carbon in a small test piece could have, when the iron itself was added molten.

TABLE I

Typical Specifications for Irons Used in Steelmaking

Grade	Per Cent Silicon	Per Cent Manganese	Per Cent Sulphur	Per Cent Phosphorus
Bessemer	1.10-1.50	0.70 max.	0.050 max.	0.100 max.
Low-manganese basic	1.10-1.50	0.70 max.	0.045 max.	0.200 max.
High-manganese basic	0.85-1.25	1.75-2.00	0.040 max.	0.300 max.

Effects of nitrogen are not yet fully understood. It is, of course, true that a nitrided surface is hard and that a steel containing a large amount of nitrogen is brittle, but additional published information is meager. Blast furnace iron ordinarily contains a maximum of about 0.004 per cent nitrogen, as previously noted, while the average is probably between from 0.001 to 0.004 per cent. In Bessemer steel the nitrogen content is usually 0.010-0.015 per cent, the great increase over the amount in the iron coming from the absorption of nitrogen from the air blown through the converter. Since the amount of nitrogen picked up in the converter is greatly in excess of that initially found in the iron, the original nitrogen content of the iron is of little importance. Open hearth steel generally contains about the same amount of nitrogen as the scrap employed in its manufacture; if the scrap is, in its turn, derived from scrap steel heats, its nitrogen content will be only about 0.002 to 0.004 per cent maximum.

The effect of nitrogen in iron has been investigated in Europe[32]. It was found that the average nitrogen content of iron from three blast furnaces was 0.0010 per cent. The nitrogen content of the iron leaving the mixer was raised to 0.0010-0.0017 per cent. In the basic Bessemer converter before deoxidation, 0.0171 per cent average nitrogen was found, the greatest increase apparently occurring during the last third of the blow. When the distribution of nitrogen in the ingot was also investigated, it was found that there was 0.0171 per cent at the surface and 0.0188 per cent at the center, indicating some nitrogen segregation.

A vast amount of literature on the general subject of oxides and other non-metallic inclusions in steel is available, and a considerably smaller volume on the effects of such inclusions on various properties of the steel, but it is not the purpose of this paper to discuss the general or even the restricted problem. This paper covers merely the effects of that portion of the oxide content of the steel which may be ascribed to the blast furnace iron, and in this matter there are two investigations[4, 9] of significance.

The conclusions of both investigations may be summarized as follows: There is no observable correlation between the oxide content of open hearth heats and that of the iron from which they were made. Further, there was no significant quality differences between open hearth heats made from normal iron and those made from cold low-silicon iron. These results tend to confirm the view that the important visible inclusions in steel were the products of deoxidation, and not those introduced earlier which had a relatively long time to rise and be assimilated by the slag.

TABLE III

*Effect of Residual Sulphur on Surface of Rod Mill Billets of Rimmed Steel**

(Results expressed as change from normal)

Per Cent Sulphur	Surface Rejections	Chipping Tons/man-day
0.030 and under	1.26%	+1.9
0.031-0.035	Normal	Normal
0.036-0.040	+0.58%	—2.7
0.041-0.045	+1.60%	—3.5

* Based on data from approximately 12,000 tons of steel.

TABLE II

*Effect of Residual Sulphur on Surface of Killed Steel for Seamless Tubes**

(Results expressed as change from normal)

Per Cent Sulphur	Chipping Tons/man-day	Outside Seams	Inside Seams	Total Tube Loss
0.030 and under	+7.1	—0.3%	—0.2%	—1.2%
0.031-0.035	Normal	Normal	Normal	Normal
0.036-0.040	—1.6	+0.6%	+1.0%	+0.7%
0.041-0.045	—2.1	+1.6%	+1.3%	+3.4%

* Based on data from approximately 13,000 tons of steel.

Certain residual metals, such as chromium and tin, arsenic, antimony, etc., may under some conditions prove undesirable in steel, even though present in small quantities. Difficulties in welding have been traced to small amounts of chromium. In general, however, these elements are more likely to be introduced into the steel by way of scrap than by way of the iron. The reviews of this subject by Sullivan[33] and his collaborators may be referred to for a general view of the residual metals situation. Although at present ordinary amounts of the other residual metals usually found in iron are not considered as exerting an important effect on steel quality, it is not beyond the bounds of probability that other elements present in small amounts, and of which little notice has as yet been taken, may have a considerable effect.

Temperature is, of course, of greatest interest in liquid iron for the Bessemer converter. In the case of the open hearth it is doubtful if the temperature of the iron has any noticeable effect on steel quality except insofar as it has affected the chemical composition of the iron in the blast furnace. In the case of Bessemer steel, however, the temperature of the iron must be considered important. If the iron is too hot when it is used, the normal course of reactions during the blow is upset, and instead of the silicon being oxidized first, followed by manganese and carbon, the carbon is oxidized first and the blow may finish with an excessively high silicon content. If the blowing is continued to oxidize the silicon, the steel itself may be badly over-oxidized. If the iron is too cold, it may be necessary to raise its temperature by tilting the converter and blowing across on top of the metal, which is undesirable as it results in burning an undue amount of iron, and over-oxidizing the steel. Over-oxidized steel—that is, steel high in FeO—if not carefully deoxidized will be poor in rolling and surface quality.

It will be gathered from this discussion that actual quantitative knowledge of the effect of iron quality on steel quality, however expressed, is by no means complete. The first reason for this is that the all-inclusive nature of the term "quality" makes it difficult to pick a representative and measurable property which serves as an index of such "quality." The second reason is that even if such an index could be selected, it is difficult in the ordinary steel plant to separate the effects of iron quality from the effects of casting, soaking, and rolling the steel before it is reduced to a form on which tests can be made.

Nevertheless, in spite of the difficulties a certain amount of such work has already been done. These studies have indicated that minor variations in the amounts of the common constituents in iron have an important effect on steel quality. There appear to be good prospects that further work along these lines will lead to a closer coordination between the efforts of the blast furnace operator and the steel maker.

TABLE IV

Effect of Manganese in the Iron on Surface of Bessemer Screw Billets

(Results expressed as change from normal)

Per Cent Manganese	Chipping Rejections	Chipping Tons/man-day
0.45 and under	Normal	Normal
0.46-0.50	+ 2.1%	—0.4
0.51-0.55	+ 8.8%	—1.2
0.56-0.60	+10.0%	—1.9

BIBLIOGRAPHY

[1] Papers on Iron Steel; David Mushet, 1840.

[2] Joseph Dawson, On the Effect of Air and Moisture on Blast Furnaces, June 11, 1800. Reprinted, Journ. I. and S. I. 74, 219-242 (1907).

[3] The Iron Manufacture of Great Britain; W. Truran, 1865, 3rd Edition.

[4] T. L. Joseph, Oxides in Basic Pig Iron and in Basic Open Hearth Steel, Trans. A.I.M.E., *125*, 204-245, 1937.

[5] Karl Daeves, Frequency Investigation as Applied to the Analysis of Pig Iron, Stahl u. Eisen, *51*, 202-204, 1931.

[6] A. L. Boegehold, Quality of Pig Iron and Castings as Affected by Blast Furnace Practice, American Foundrymen's Association, April, 1929.

[7] H. Braune, The Formation of Cyanides in the Blast Furnace Process, Stahl u. Eisen, *45*, 581-582, 1925.

[8] R. Franchot, The Theory of the Blast Furnace, Year Book, American Iron and Steel Institute, 1927, pp. 135-164.

[9] C. H. Herty and J. M. Gaines, Unreduced Oxides in Pig Iron and their Elimination in the Basic Open Hearth Furnace, Trans. A.I.M.E., *84*, 179-196, 1929.

[10] A. Wagner, Effect of Temperature, Pressure and Moisture of the Atmospheric Air on the Working of the Blast Furnace, Stahl u. Eisen, *40*, 1397-1403, 1920.

[11] Economy in Fuel, Prideaux, 1853.

[12] James Gayley, The Application of Dry Air Blast to the Manufacture of Iron, Journ. I. and S. I., *66*, 274-322, 1904.

[13] E. H. Lewis, The Use of Silica Gel as a Medium for Drying Blast, Journ. I. and S. I., *116*, 43-55.

[14] W. Feldmann and J. Stoecker, Gas Flow in the Blast Furnace and Influence on It of the Mode of Charging, Stahl u. Eisen, *55*, 1559-1564, 1935.

[15] J. Klarding, The Physico-Chemical Principles of the Burdening of Iron Ore, Archiv fur das Eisenhuttenwesen, *8*, 277-280; 325-328, 1935.

[16] A. Wagner, A. Holschuh and W. Barth, Blast Furnace Burdening on Physical Principles, Stahl u. Eisen, *52*, 1109-1116, 1932.

[17] J. Stoecker and H. Cornelius, The Distribution of Gas in the Blast Furnace Shaft, Stahl u. Eisen, *50*, 1217-1221, 1930.

[18] W. A. Bone, L. Reeve and H. L. Saunders, An Experimental Inquiry into the Interactions of Gases and Ores in the Blast Furnace, Journ. I. and S. I., *115*, 127-180, 1927; *121*, 35-96, 1930.

[19] C. C. Furnas, Flow of Gases Through Beds of Broken Solids, U. S. Bureau of Mines, Bulletin 307, 1930.

[20] C. C. Furnas and T. L. Joseph, Stock Distribution and Gas-Solid Contact in the Blast Furnace, U. S. Bureau of Mines, 1930, Technical Paper 476.

[21] S. P. Kinney, Irregular Gas Flow in Blast Furnaces, U. S. Bureau of Mines, 1930, Report 2978.

[22] T. L. Joseph, Porosity, Reducibility and Size Preparation of Iron Ores, Trans. A.I.M.E., *120*, 72-98, 1936.

[23] Oliver Bowles, Metallurgical Limestone, U. S. Bureau of Mines, Bulletin 299.

[24] T. L. Joseph and E. P. Barrett, Resistance of Iron Ores (and limestone) to Decrepitation and Mechanical Work, Trans. A.I.M.E., *90*, 363-377, 1930.

[25] C. A. Rowley, The Testing of Coke, Bulletin of the British Cast Iron Research Association, *5*, Sept., 1937.

[26] C. S. Gill, The Effect of Varying Ash in the Coke on Blast Furnace Working, Journ. I. and S. I., *116*, 91-101, 1927.

[27] H. W. Johnson, Effect of Variations in Coke Ash on Pig Iron Analysis, Trans. A.I.M.E., *105*, 28-36, 1933.

[28] W. F. Holbrook and T. L. Joseph, Relative Desulphurizing Powers of Blast Furnace Slags, Trans. A.I.M.E., *120*, 99-120, 1936.

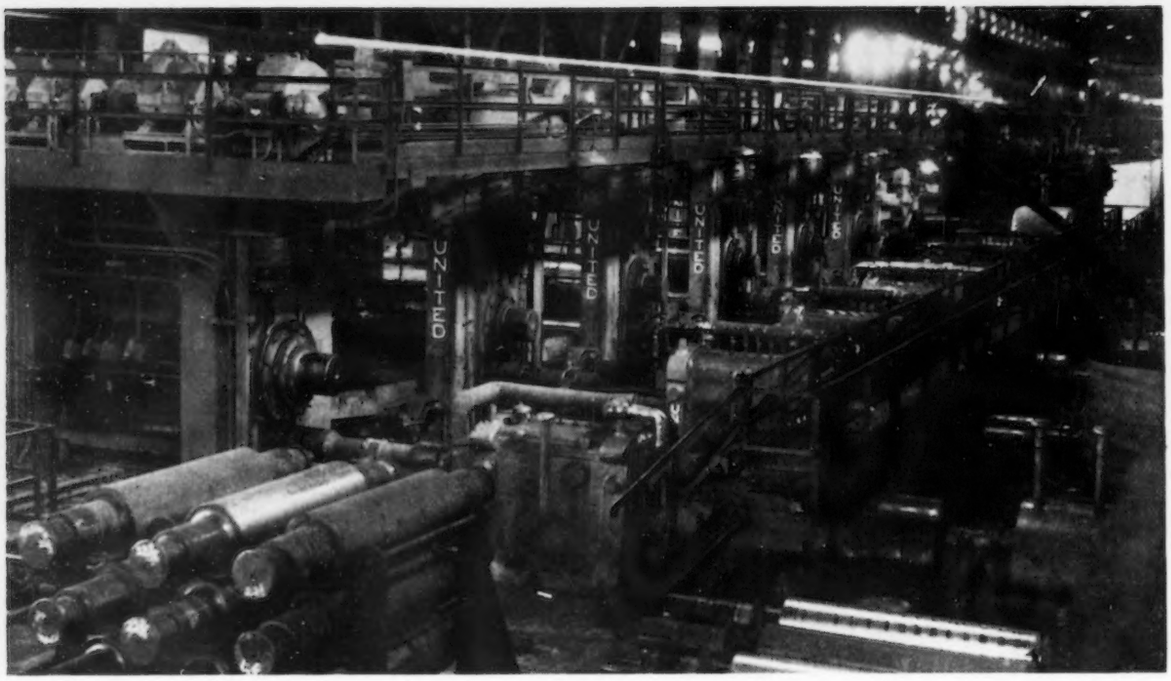
[29] F. M. Rich, Some Observations and Theory on Slack Wind Blast Furnace Operation, Trans. A.I.M.E., *116*, 26-52, 1935.

[30] C. C. Henning, Manufacture and Properties of Bessemer Steel, Metals Technology, June, 1935, TP-623, pp. 1-21.

[31] 20th Open Hearth Proceedings, A.I.M.E., p. 57, 1937.

[32] O. Quadrat and M. Pilz, Study of Nitrogen in the Thomas Process, Chimie et Industrie, pp. 694-697, 1933.

[33] J. D. Sullivan and R. A. Witschey, Residual Metals in Open Hearth Steel, Metals & Alloys, 7, 171-173, 1936, and previous articles in Vols. 3, 4, 5 and 6.



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THE finishing line at Otis Steel Co.'s continuous hot strip mill has been widened, speeded up and equipped to produce coiled strip of double its previous maximum weight and length. This view, taken on the drive side of the hot mill, shows the six 77-in. finishing stands, two of which have been added in the improvements just completed.

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Otis Steel Co. Modernizes

IN a modernization program recently completed, the continuous strip mill built in 1931 by Otis Steel Co. at Cleveland has been widened, speeded up and improved to handle coils of double the previous maximum weight and length.

The changes, launched during peak operations last year, were accomplished without withdrawing the hot strip and cold rolling mills from production for more than a day at any one time, except during one week when a complete change of gear reduction equipment was necessary to speed up the hot mill finishing train.

Due to certain provisions made at the time the mill was built in 1931, the improvements were accomplished with a minimum of expense.

Width of the hot and cold mills has been increased from 72 in. to 77 in. and the delivery speeds increased from 1200 to 1600 ft. per min. in the hot mill, and from 300 ft. to 600 ft. per min. in the cold mill. The hot mill line was rearranged and augmented by transfer of a four-high roughing mill from the roughing group into position as the fifth mill in the finishing line, which was increased from four to six stands. A new four-high finishing mill, which becomes No. 6, and a finishing scale breaker with latest type hydraulic spray box were purchased.

Slotted shoe plates to which the existing mill housings were anchored provide flexibility and facilitated widening of the entire rolling mill line. Tables and guides throughout this mill were widened and supplemented to accommodate maximum width strip rolled in the enlarged mill, aprons on the run-out table being machined to accomplish this purpose. A new reel equipped with unloader has been installed in the hot mill, replacing one of two reels of an earlier type.

Improved facilities for roll grinding and storage have been provided in a new roll shop 50 x 120 ft., constructed alongside the hot mill building. A new 50-ton crane has been installed in this roll shop where two roll grinders have been installed.

The mill has been equipped with new rolls required by the increased rolling width. The rolls were produced in the Otis foundries. A transfer car has been installed between the mill and the roll shop and mechanical equipment, including roll hook, platforms, walkways, etc., altered to accommodate the mill changes.

Extensive changes were required in the layout of busses, switchboards, conduits and controls. Two new 3500-hp., 175/350 r.p.m. d.c. motors, one 6000-kw. motor generator set, and a 400-hp., 300/1050 r.p.m. d.c. motor were added to drive the fifth and sixth finishing stands and the finishing scale breaker.

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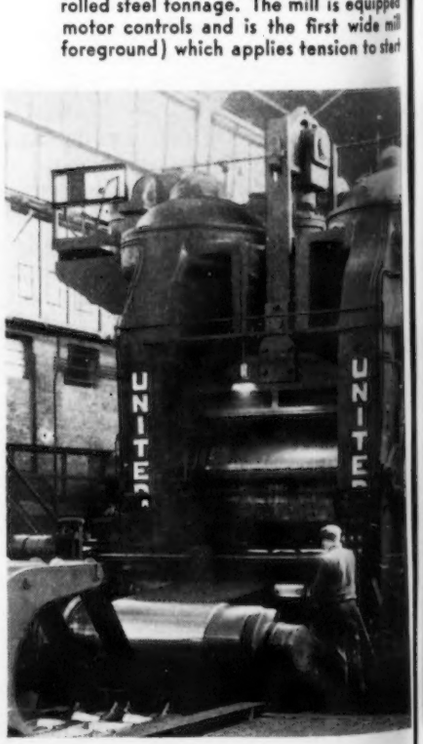
ADDITION of a third stand in the Otis has doubled the rolling capacity and when it was built in 1931. It now produces 300 ft. at that time. It has been widened enabling Otis to meet the requirements rolled steel tonnage. The mill is equipped motor controls and is the first wide mill foreground) which applies tension to strip



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A NEW straight and cut shear has been installed at the Otis Steel Co. in conjunction with recent continuous mill improvements.

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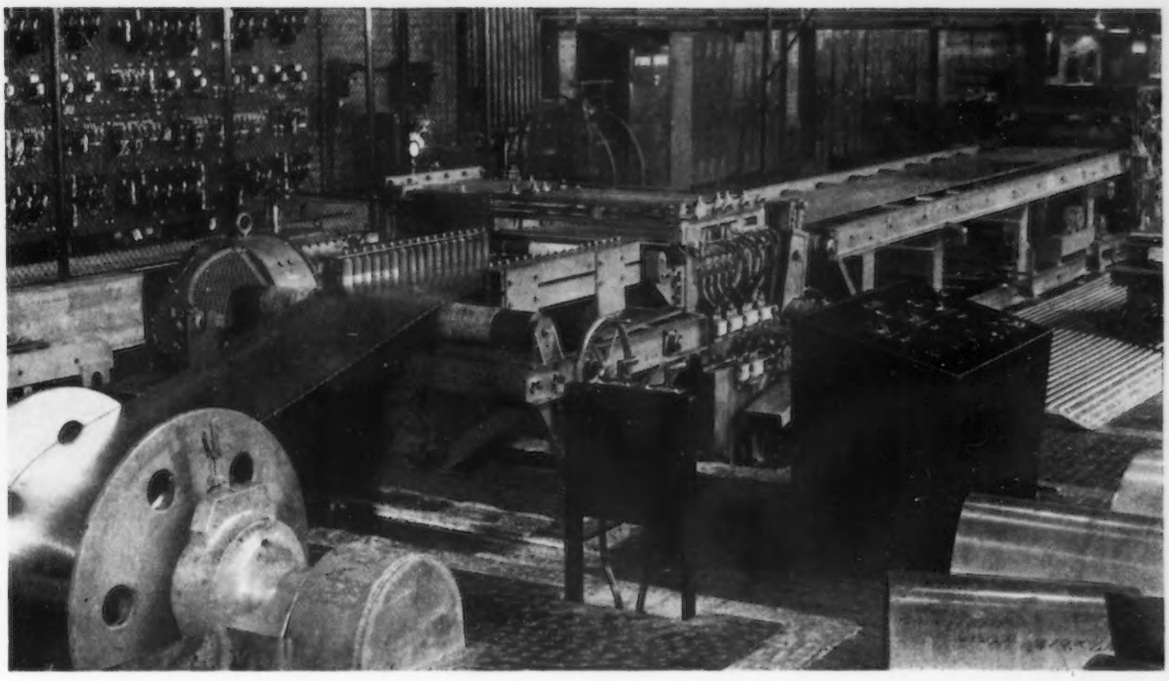

Strip Mill at Cleveland

These motors and generators increased the short circuit values to an estimated 350,000 amp. and a possible 500,000 amp. load. Aluminum channel busses and high strength insulators were therefore installed and additional circuit breaker provided as protection to both sides of the hot mill line. Variable frequency alternator sets for the hot mill runout tables and coilers also had to be changed to accommodate the increased delivery speeds.

The continuous pickler building was extended 40 ft. to accommodate a completely new installation at the entry end, where a new breaker and looping pit have been installed. The entire pickling line has been widened to handle strip of the maximum width produced on the new mills and additional tanks have been installed.

Conveyors connecting pickler, annealing and cold mill buildings were modernized. All annealing is now handled in tubular annealing furnaces with covers of the removable type, each serving a group of three annealing boxes.

Installation of a new third, four-high stand in the widened cold mill not only doubles the speed of the finishing unit but permits reduction of 0.109 in. strip from the hot mill down to No. 20 gage (0.0375 in.) at a single pass. This tandem mill is equipped with a belt wrapper which makes it possible to start finished cold strip on take-up reels by applying tension on the reel. The new finishing stand is equipped with oil film tapered neck bearings of sealed sleeve type and special tanks, pumps and other equipment have been installed to permit similar lubrication of the other two stands in the future.

A new shear line with side trimming cutters, slitters and leveler has been installed adjacent to the cold mill and leads directly to the skin pass mills which were widened. A new roll grinder has been installed in the connection with the cold mill expansion and is accommodated in a special roll grinding shop alongside.

A new 1250-hp., 250/612 r.p.m. d.c. motor to drive the new four-high stand in the cold mill and a new 250-hp., 300/1250 r.p.m. d.c. motor to drive the take-up reel have been installed in the cold mill motor room which was extended 30 ft. to accommodate this new equipment. Electrical conduits to this mill were rerouted and the entire control scheme modernized, with a new generator secondary panel, a new reel control panel and tension regulator. Dynamic braking has been provided to insure quick stopping of the main drive motors in the face of finishing speeds up to 600 ft. per min.

Products of the widened Otis mills will include widths up to 74 in.

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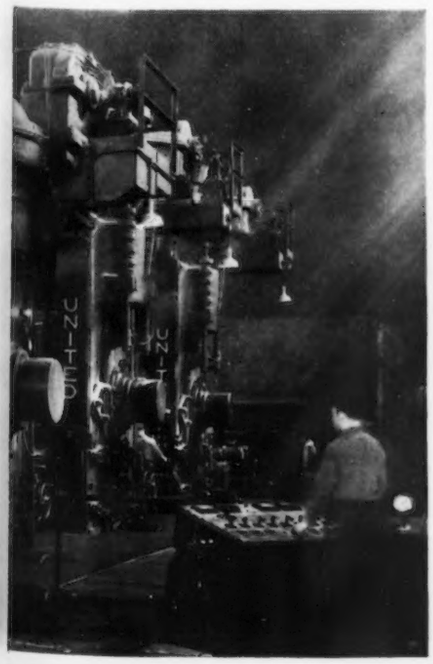
Steel Co.'s continuous cold rolling mill speed of this mill, largest in the country strip at 600 ft. per min., compared with to produce strip up to 74 in. in width, of industries using 95 per cent of all flat with the most modern lubrication and equipped with a belt wrapper (left the finished cold strip on the take-up reel.



Steel Institute Hears Discussions of

MORE than 900 iron and steel manufacturers who attended the American Iron and Steel Institute's general meeting in New York were back home this week to resume their fight against depression.

Still ringing in their ears was a warning by General Hugh S. Johnson that their industry can escape from a "popular and political doghouse" only by adopting a middle road, which is necessary, he said, to preserve the profits system against the gross extremities of Communism and Fascism.

Ernest T. Weir, National Steel Corp. chairman, told the convention that the steel industry must begin a broad-gage campaign to explain its aims, its policies and its methods to the American people.

And Tom M. Girdler, Republic Steel Corp. chairman (again elected president of the institute in approval of his leadership for the past year), declared: "I don't think that either the executives or the prices of the industry are inflexible. I think, however, that he (General Johnson) does not understand how we are groping for a way to do some things."

IT is becoming increasingly clear that there can be no real and lasting improvement for industry until some way has been found to release the flow of capital into the productive channels of private enterprise.

* * *

WHEN Government sets up vast bureaucracies to control industry, to restrict its functions, and to compete with it, the net result is to stifle private enterprise and frighten investors.

—T. M. Girdler

Criticizes Price Policy

Mr. Girdler, the institute's directors sitting on a stage in the Waldorf-Astoria's grand ballroom and the hundreds of institute members listening had been startled to hear General Johnson's charge that steel prices are too "sticky" and must be reduced and his assertion that the entire steel industry must bargain collectively according to the provisions of the controversial Wagner Act. (Collective bargaining was started in the steel industry, Mr. Girdler said.)

After severely criticizing the "third" New Deal, General Johnson turned suddenly to a program for steel.

"What this situation needs on both sides is action. Neither gestures nor words will do. And I think it is you who are in the popular and political doghouse; you must act first. What can you do?

"Well, take this matter of collective bargaining by independent agencies of workers. It is the law of the land. It is the sentiment of the people. It is a trend of the times. There is not a company represented in this room that did not, in the President's reemployment agreement, promise it. Some of you don't like it. But like it or not, you have got to live with American sentiment, in accordance with American institutions, and, while this may be a new one, it is none the less genuine.

"Take the question of prices. The whole country believes, including the foremost of independent economists, that iron and steel prices are too inflexible—sticky—and that their present levels are a principal influence retarding recovery. I know your problem as well as anybody and I also know the pros and cons of this whole price problem. But you are butting up here against a growing flood of public opinion that can't be diverted and resisted as it could in the old days.

"Why don't you take some action here even at a considerable sacrifice of profits or even if some high cost producers are eliminated? You have plenty of them and there has been too much holding of umbrellas over lame ducks in this industry for a good many years."

New Deal Discrediting Industry

The impression has gone out to this country, partly through "third" New Deal propaganda, and partly through the actions of some industrialists, said Johnson, that most of this industry wants to turn the hands of the clock clear back beyond the "first" New Deal. "The popular idea is that it is enough for this Administration to advance any liberal project for you to oppose it, or at least never to support it. It makes no difference whether it is true or not. It is a widespread conviction and convictions make votes."

The penalty for failing to revise the public's impression of the steel industry, General Johnson said, will be "management by the Government." Already, he said, the New Deal is discrediting industry to "soften it up for Mr. Wallace's (Secretary of Agriculture) ever 'ga-ga' granary for industry."

T. M. Girdler Outlines Steps Necessary for Recovery

As necessary steps toward business and economic recovery, Mr. Girdler recommended:

1. The development of a sound national fiscal policy.

2. Adoption of a predictable Government attitude toward industry.

3. Such Government regulation of industry as is in the public interest, but which does not compete with industry or put it in a straitjacket.

4. The laying of a foundation for industrial peace by sound amendments of the Wagner Act, making it fair to employees and employers alike.

"Although the outlook for the immediate future is obscure," he said, "there appears to be no basic economic reason why this depression should be of prolonged duration. The causes leading up to the collapse of 1929 had no counterpart last year. Nine years ago credit was dangerously over-extended, interest rates were high and a

Ways to Bring Business Recovery

tidal wave of bank failures was close at hand. Today, none of those conditions exists.

Ample Supply of Capital

"Someone has characterized this as an 'under-investment' depression. The normal flow of capital has dried up, not because of any shortage of capital, but because of uncertainty or fear on the part of millions of large and small investors. Since 1933 bank deposits have increased by more than 17 billion dollars, and today are near the peak for all time. Clearly, then, capital is in plentiful supply, and therefore is available for investment if the investors have confidence in the immediate economic situation.

"There are some who profess faith in the ability of Government to spend and to legislate the country into prosperity. But the experience of the recent past as well as the long years of history bear witness to the futility of such faith.

"It is becoming increasingly clear that there can be no real and lasting improvement for industry until some way has been found to release the flow of capital into the productive channels of private enterprise.

"That can be done only by the removal of the artificial barriers to production so that private enterprise can function. Nothing less than that will restore the lost confidence of investors. Apparently they have come to believe that a nation without any apparent limit on taxes, without a fair and impartial labor policy, without any understandable policy toward business, offers little opportunity for investment or return on enterprise.

No Objection to Fair Regulation

"There can be no objection on the part of industry to fair and reasonable Government regulation. In this complex age, industry needs for its guidance certain rules and regulations by Government—but rules that are not subject to constant and upsetting change.

"The part of Government in business should be the part of a traffic policeman. It should set up fair and proper regulations and catch those who violate the rules. But when Government sets up vast bureaucracies to control industry, to restrict its functions, and to compete with it, the net result is to stifle private enterprise and frighten investors. It is not the wrongdoer alone who suffers. Everyone engaged in private enterprise finds himself in the shackles of Government control.

"One result of the direction in which we have been moving is written large in the unprecedented record of labor disturbances over recent years.

Losses From Labor Disturbances

"Perhaps no single cause has contributed more to the present widespread distress in this country than have the staggering losses in wages and in production resulting from these disturbances. In the last five years workers have lost nearly 100,000,000 days of productive labor from strikes. The worst of this has come about under the regime of a law which was heralded as ushering in a new era of industrial peace. Actually, because of the one-sided character of the act, and of its administration, it has come close to legislating the country into perpetual industrial warfare.

"I am confident that efforts to drive a wedge between employers and employees and between the public and business will not succeed in this country.

Steel Industry a Target

"Because of its size, the steel industry is always a target ready to hand for the shafts of political demagogues. We may resent the unfairness of these malicious attacks upon us which arise from the fact that our industry and the needs of the nation inevitably require organizations of large size as well as small ones. Yet they serve to remind us that our every move is subject to public scrutiny, and accordingly our houses must be kept in order and our policies in line with the public interest. The steel industry cannot afford to forget for a moment its obligations to its employees, its customers and to the public.

"To all of these the industry has an obligation to make a reasonable profit and pay a fair return to the holders of its securities, because a fair return on investment is necessary to attract the capital needed to expand productive facilities, to provide more jobs and better working conditions, to improve the quality of product and to keep abreast of the growing needs of the country.

"Unfortunately, the problem of adequate profits is one that the industry is finding ever more difficult to solve. That is true not only in bad times, but in better times as well. The reason is not hard to discover. It lies in the fact that costs have climbed up to the roof and, it seems, have frozen there.

"Notwithstanding that fact, the industry is under recurring political attack because of so-called inflexible prices. Some critics, most of them pseudo-economists, with only a superficial knowledge, if any, of the reali-

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* * *

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* * *

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—T. M. Girdler

ties of the steel industry, are fond of pointing to the prices of agricultural and certain other products on the one hand and the prices of steel on the other as evidence that this industry, by monopolistic methods, is able to manage prices and repeal the law of supply and demand.

Rigid Steel Prices Due to Costs

"Why, they ask, have steel prices not declined with falling demand, as prices of various other products have?

"The answer to that question is clear. It is simply that the immediate out-of-pocket cost of making steel is so large a proportion of its value that it is impossible for the producer who wants to survive to reduce his price materially unless the price of his labor, materials and other important elements of costs fall correspondingly.

"To avoid bankruptcy, it is absolutely necessary for steel companies to reduce output when demand declines. And experience has proven time and time again that price reductions for steel in times of falling demand do not stimulate buying.

"That does not mean that steel is insensible to the law of supply and demand, which of course operates in every industry. But steel is a durable product. It is not eaten like wheat, or pork, or worn out as quickly as shoes or clothes. People can wait a while before replacing their old goods made of steel with new, and consequently the law of supply and demand operates more slowly.

"Moreover, the cost of steel is only a small factor in the aggregate costs of most of the products into which it goes. You are all familiar with the fact that while steel constitutes fully 80 per cent of the weight of an automobile, it accounts only for around 10 per cent of the price. For a medium-priced dwelling costing around $4000, the cost of steel at the mill used in construction does not exceed $133.

"From these examples and from countless others of a similar nature that come to mind, it is clear that changes in the price of steel do not constitute the controlling influence on demand for finished articles.

"In addition to those considerations, it is a traditional practice among manufacturers of all kinds to delay purchases of raw materials as far as practical in a declining market.

"These are factors which affect the short term operations of the law of supply and demand in steel. Over a period of years the law operates with complete effectiveness. I need only cite the far-reaching changes that have accompanied developments in production of sheet steel over the past 10 years. Here we have had greatly reduced prices, improved quality, increased production and vastly expanded markets. The steel industry is constantly striving to improve the quality of all its products, and to heighten the efficiency of production, because it knows in that direction lies broader and ever broader markets.

No Mystery About Steel Prices

"There is no mystery about steel prices. There is no hidden hand in the industry with power to prevent price reductions except the hidden hand of costs.

"Accordingly, if steel prices have not declined in recent months it is simply because each producer knows his prices cannot come down in the face of present costs. A similar situation prevailed in the years between 1929 and 1933. Prices were reduced and concessions of all sorts granted all along the line, and very shortly we had a condition of cut-throat competition which brought wide distress rather than increased sales.

"By what standard can it be said that present steel prices are too high? Certainly they are not too high relative to costs. Certainly they are not so high as to result in excessive, or even large, profits. The record on that point is complete. I will only point out here that, had prices been 10 per cent lower than they were in 1937, the industry's biggest year in production except for 1928 and 1929, the industry's profit last year would have been entirely wiped out.

"Have steel prices moved away from their 'normal' relationship with other prices? The answer to that is that there is no 'normal' relationship among different groups of prices. What may appear to be 'normal' this year may be wholly abnormal next year, because prices within the general structure do not move upward or downward uniformly or in the same degree. So-called relationships are always being disturbed.

"The peak of steel prices in the post-war period was reached in 1923. From then on until 1933, with only a slight interruption in 1929, they tended downward. The present price level is not as high as it was in 1923. It approximates the 1926 level, which year has frequently been put forth as the yardstick to go by. And that is true despite the fact that the wage rate in the industry is 28 per cent higher than it was 12 years ago.

"Meanwhile, there has been a steady and in many cases extraordinary improvement in quality. That has been thrown in for good measure, without any corresponding increase in price. That is an aspect of the price problem which your demagogue and your pseudo-economist avoid, because it does not fit their pre-conceived notions.

Wages the Highest Cost Factor

"The highest single factor of costs in the steel industry is that of wages.

THERE is no mystery about steel prices. There is no hidden hand in the industry with power to prevent price reductions except the hidden hand of costs.

* * *

WE are not going back to the "good old" days of doing business.

—T. M. Girdler

In recent years we have witnessed a swift rise of wages, in steel as in many other industries. In steel the advance of wages has been more rapid than that of prices. Wages in the industry were increased in November, 1936, and again in March, 1937. These two wage increases amounted approximately to 31 per cent. They brought hourly earnings of steel wage earners to the highest level in the history of the country. The wage rate today is 25 per cent over the average of 1929.

"Meanwhile, what about prices? During the period that wages were going up 31 per cent, prices went up only about 20 per cent. And prices today are only 13 per cent over the 1929 level.

"Compared with the bottom of the depression in 1933, hourly wages in the steel industry today are 56 per cent higher, while prices are but 34 per cent higher. Strange as it may seem to those who would like to believe otherwise, the facts are that steel prices ran a poor second to wages in the upward swing of recent years.

"Over short swings it is obvious that prices and wages in steel must maintain an approximate relationship. But over long periods the record is one of

steady reductions in hours, and of far greater advances in wages than in prices.

"If we examine what the steel worker was getting in his pay envelope and the hours he was working in 1895, we find the hourly wage for common labor was 12 cents and the work week was 67 hours. Today, the hourly wage rate shows an increase of 420 per cent, and the number of hours (considering the present normal work week as 40 hours) shows a decrease of 40 per cent. During that same period the average price of steel has increased by less than 70 per cent, though its value in terms of quality has multiplied many times.

ALTHOUGH the immediate signs are not bright, I have not lost hope for the steel industry because I have not lost faith in America.

* * *

WE are now tasting the bitter fruit growing from the fallacy of trying to boost income, output and employment by increasing costs.

—T. M. Girdler

Many Wage Increases Uneconomical

"What is true of steel is likewise true of industry generally. Wages have been advanced throughout most industries. In many cases it is now apparent that many of the wage increases were uneconomic and difficult to absorb, if not excessive. The advance of hourly wage rates to uneconomic levels in many cases, combined with labor disturbances, sit-down strikes and violation of property rights, have discouraged new enterprise and new investment, and that spells less production and fewer jobs.

"We are now tasting the bitter fruit growing from the fallacy of trying to boost income, output and employment by increasing costs. We are learning the costly lesson that high hourly wage rates do not of themselves insure either a full week's work or a full dinner pail. The best interest of the mass of workers of the country is not served by the highest possible hourly rates of pay that can be exacted for some, but the highest possible annual earnings and employment for all. The only end that counts is the amount in the pay envelope on payday, and continuity of employment.

Annual Wage Not Now Feasible

"In some companies in certain industries experiments are being made with annual wage plans. Employers everywhere are watching these experiments with keen interest. I would be happy, and I am sure every one of you here today would be happy, if it were possible to adopt a plan of annual wage in the steel industry. But obviously under conditions which subject an industry to such violent fluctuations as those in steel, any such plan would appear today out of the question.

Immediate Outlook Not Bright

"Although the immediate signs are not bright, I have not lost hope for the steel industry because I have not lost faith in America. I believe that despite all its groping and stumbling, this country is going to come out of its many troubles with a firmer faith in itself and its great institutions.

"It is going to get its head out of the clouds and put its feet on the ground and go to work. It has got to do that because there is no other way out of our present difficulties.

"We are not going back to the so-called 'good old' days of doing business. Industry has come a long way forward in the past decades in its ideas, its methods and above all in its social consciousness, and it will move forward on that line. But there will be a return, I believe, to some of the old and unshaken verities. People will learn again that only by work and increased production, and not by idleness of labor and capital, can wealth be made more abundant and living standards of all the people raised. They will learn that behind the false whiskers of so-called 'planned economy' lurks the ugly countenance of the collectivist state. They will learn that true progress can be, and has been, accomplished more effectively by the free functioning of private enterprise than by any other economic system known to man.

"We continue to hear a great deal about cooperation between the Government and business as a means of restoring confidence. Cooperation implies a mutuality of effort and interest to achieve a common end. It would not be cooperation on the part of industry merely to applaud every act and idea of the government regardless of whether or not those acts and ideas were economically sound. But I am quite sure that the steel industry would welcome wholeheartedly the opportunity to cooperate in any sound national program to revive industry and to reassure investors that the system of free enterprise, which has made America great, is not doomed.

"Such a program is not difficult to formulate. The outstanding things that need to be done are, in the main, clear, definite and self-evident. In fact, the program calls aloud for prompt adoption. But so far it has been a voice in the wilderness, although Congress has offered some encouragement. Congress has taken an important first step in revising the tax law to bring it much closer to the sound principle of taxation for revenue and away from the unsound theory of taxation for reform and punishment.

"Other steps are urgently needed in such a program, some of the most important of which would include: 1. the development of a sound national fiscal policy; 2. adoption of a predictable Government attitude toward industry; 3. such government regulation of industry as is in the public interest, but which does not compete with industry or put it in a strait-jacket; 4. the laying of a foundation for industrial peace by sound amendments of the Wagner Act, making it fair to employees and employers alike.

"I conceive it to be the solemn obligation at this hour upon all responsible elements of the nation, Government and business alike, to concentrate upon a single purpose. That purpose is to get the monkey wrenches out of the industrial machine so that the stalled wheels can turn and the unemployed can get jobs. Nothing else is so urgent. Nothing else is so important. But let the people of America not be duped—our present sickness cannot be cured by shots in the arm. There must be a genuine correction of the real causes.

"I have faith that the American people will insist upon application of genuine remedies. I believe they will demand removal of the present artificial barriers to the functioning of private enterprise. I am sure they will not permit anything to stand in the way of the return of confidence, of large-scale employment, and of prosperity. If that is done, we need have no fear about the future of this country or about the steel industry."

E. T. Weir Recommends Broader Public Relations Policy

RECOMMENDING that the steel industry, through the institute, greatly broaden the scope of its public relations activities by telling "the story

(CONTINUED ON PAGE 89)

THIS WEEK ON THE ASSEMBLY LINE

By W. F. SHERMAN
Detroit Editor

. . . Ford shutdown for week to cut auto assembly total about 12,000 units . . . Foreign sales show first sign of decline as GM reports 4.9 per cent drop . . . Leaf Spring Institute devoted to study of improvements for autos . . . Auto plants play part in machine design trend.

DETROIT—Most of the automobile manufacturers continued to revise downward their production schedules last week as sales slowed up seasonally. Despite gains at three plants—Chevrolet, Packard and Studebaker—the week's production was placed at 45,120 units, compared with 46,810 the previous week and 132,425 assemblies a year ago, according to Ward's Automotive Reports.

General Motors, due to Chevrolet, turned out 20,300, about 2000 more than a week ago, but this upward step was not enough to offset losses of more than 1500 at Chrysler and more than 2000 in the Ford total. The outlook for the present week is for considerably lower production, with the Memorial Day holiday affecting many. In addition, Ford has announced the shutdown of all plants until next Monday, making 30,000 a conservative guess for the industry's entire production.

A full 19-day work program for the remainder of June is planned by Ford, according to announcement. This will mean a five-day schedule for the rest of June, if carried out, whereas last June the company went on a four-day week to spread employment.

Decline in auto sales totals in foreign markets is indicated by General Motors overseas sales data. During April, sales to dealers in these markets were 32,957 units, representing a drop of 4.9 per cent from sales in April of last year. In the first four months of 1938, sales were at a record volume level of 130,150 units, an increase of 7.3 per cent over the first four months of 1937. The last 12 months' period, ended in April, had shown an increase of 12.7 per cent over the volume of sales in the 12 months which ended April 30, 1937.

KING FORBES, former assistant chief engineer of Buick, a stylist of automobiles and auto show exhibits, has turned his attention to the "streamlining" of machines for safety, ease of maintenance and sales appeal.

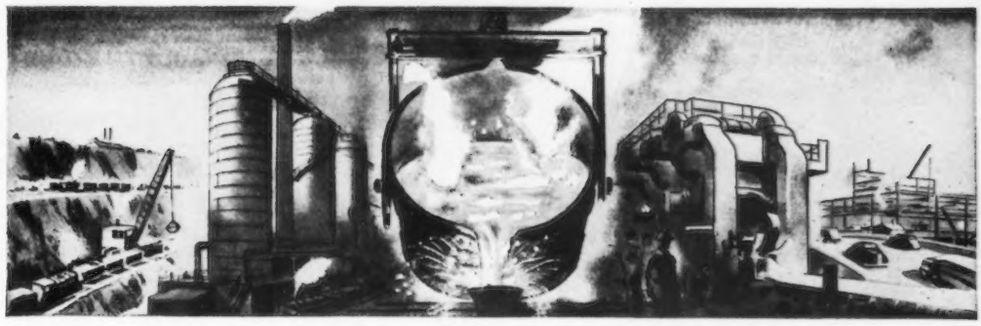
Improving Leaf Springs

Recent popularity of coil spring rear suspensions, as on the 1938 Buick models, has spurred research into ways of improving leaf springs for automotive uses. Development work by the Leaf Spring Institute with thin main leaves has brought considerable thought to bear on the subject of spring leaf eye strength, with new designs and manufacturing technic indicated as a way to retain prestige and popularity for the leaf spring. J. H. Shoemaker, executive secretary of the institute, revealed at a recent Detroit meeting of the Society of Automotive Engineers that a "ribbed eye" construction has been adopted by one major car manufacturer for 1939 production. More interesting from the production viewpoint is a report on progress of experimental work on the welding of eyes. It is learned that this process now shows considerable promise because of the uniformity of grain structure of present alloy spring steels and the advance in welding technic. Both General Electric and the Lincoln Electric Co. have been reported active in this field.

Another promising type which varies from the present and would require changes in manufacturing methods and equipment is of the "scroll" type, actually about one and one-quarter eye. A hole is pressed in the scroll and a nib pressed in from the outside section of the eye through this hole, thus anchoring the eye in all directions. The idea of this and the welded type is to retain the eye shape against loads.

Lower cost of steel for long, wide spring leaves was emphasized as one of the good reasons for changing to longer and wider springs. K. K. Probst, another speaker on the S.A.E. program, added this to the technical reasons he advanced for changes. He said that there would be an economy because heavier gages do not call for "extras" applicable to excessively thin sizes. Wider springs would have fewer leaves, which also might cut costs, he said. Spring dimensions

BIG BUSINESS—NO. 9



The Industry for Industry

STEEL—the master tool of civilization—has been a dynamic force in American progress.

The American standard of living is made possible by more than 100,000 steel products—things we use directly, such as refrigerators and automobiles, and the things which serve us indirectly, like machines, bridges and power lines. The amount of steel in use in this country is estimated at 18,000 pounds per person, which is 50% to 200% more than in other leading steel producing countries.

In 1865 the United States was producing only 3% of the world's steel. By 1900 it was producing nearly 50%. In 1937, however, America produced only 38%. The growth of the steel industry in America was not due so much to an abundance of raw material as to an abundance of private enterprise—the necessary alloy for human progress.

Individual initiative and steel seem mutually attractive. 9 out of 10 steel executives rose from the ranks. 93% of steel workmen rate as skilled or partly skilled. Steel is a progressive, rugged business ready to spend millions to keep its plants modern, to develop new processes and to further metallurgical research. More than $320,000,000 was so spent in 1937, without taking into account some $200,000,000 spent for maintenance and repairs.

The capital investment for each job in this industry is $11,500, and approximately 500,000 men are normally employed at wage rates which in 1937 were 25% above 1929—triple the average rate paid to steel workers in eight foreign countries. Taxes of $169,000,000 paid by the industry in 1937 were 65% greater than in 1929 and equivalent to $330 for each worker employed.

As bankers for commercial and industrial enterprises, it is part of our responsibility to contribute something to a better understanding of the facts about private business.

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have little effect on the weight of steel in the springs, since the number of pounds of steel is determined fundamentally by the load carried, he said.

Cold Heading Development

Two years of experiment with new equipment for use in connection with cold heading parts for automotive applications have drawn to a close with the introduction to the general field of a wire drawing and feed attachment for cold headers. In this process, of course, steel slugs are cold forged into bolts or other similar parts, usually from wire stocks. The new feed equipment, built and tested by the B-W Mfg. Co., 1128 Harper Avenue, feeds less expensive rod stock into a wire drawing die, then into the header. The difference in cost between hot rolled rod and the cold drawn wire is about 20 per cent. Better metal flow in the finished product is claimed and the improvement attributable to heading immediately after drawing the wire is said to be marked. Without heat treatment these parts are being used as the equivalent of ordinary cold headed parts after heat treatment.

Machinery Being Streamlined

With its constant demand for machinery engineered to its particular needs, the auto industry has taken an increasing interest in machine design. It waited for this year, however, before one of the auto body stylists would step into the field of streamlining factory equipment. King Forbes, who as special assignment man and assistant chief engineer has styled Buick bodies and Buick exhibits for the important auto shows and lobby displays, has become a consultant stylist and engineer.

He comes into the news today because one of the auto companies is now testing a 4 to 6 ton press which is a Forbes design. The press was delivered last week to the auto company for pressing together a bushing and cast pump body assembly. It is "self-inspecting," in that it automatically rejects parts that slide together too easily, and is a product of Metalwood Mfg. Co., which has built such equipment for 25 years.

This trend to streamlined machines in the auto plants is exemplified by numerous setups designed by the plants' own men. Lower cost of maintenance and keeping the shop clean is one explanation advanced for the trend. Generally space savings and safety are others.

Cab-over Engine Trucks

Ford's announcement of a cab-over engine truck a few weeks ago is followed, as expected, by others of the same type sponsored by competitors. About a year ago it was reported that Chevrolet was working on COE trucks; last week the type was announced on three wheelbases, 108 in., 113½ in. and 157 in. Simultaneously, Dodge put out competitive 1½-ton trucks on 108, 133 and 159 inch wheelbases and larger trucks (two ton) on 108, 133, 159 and 177 in. chassis. Accessibility of the engine and other parts requiring service are important design features.

Pontiac To Continue Eight-Cylinder

Pontiac will continue to build an eight-cylinder car next year, according to H. J. Klingler, general manager. "While most rumors that originate in the automobile industry don't merit the importance of a denial, one has been so persistent that I feel it needs an official correction," he said last week. "That is the rumor regarding the possible restriction of our lines of cars for next year. Pontiac Motor will definitely continue to build an eight-cylinder automobile in 1939. This eight-cylinder volume comprises a valuable and growing part of our business and we expect to make it even larger during the 1939 model run."

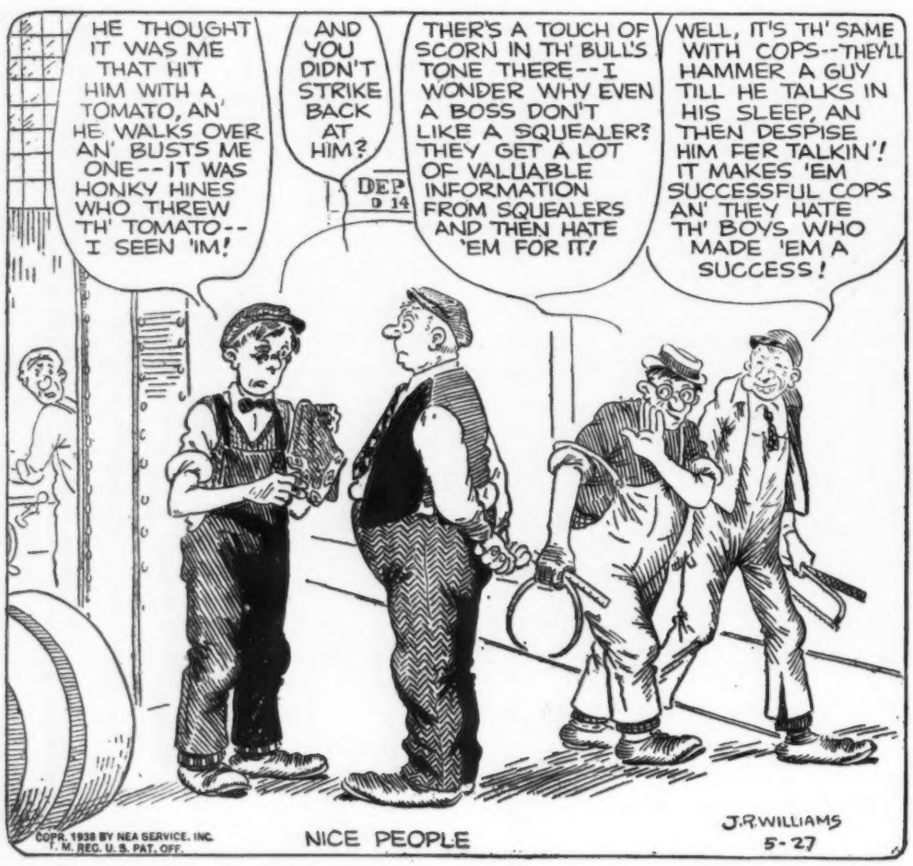
Cadillac Safety Contest

Cadillac has been operating a safety contest among its workers with valuable prizes awarded monthly in a drawing in departments which have compiled accident-free records. The plan was originated last January and has been so productive of good results that it has been kept in operation much longer than the usual run of such events. According to V. A. Olsen, Cadillac-LaSalle works manager, the prizes are "luxury" items that every family can use. The list includes radios, bathroom scales and vacuum cleaners.

Ford Program Goes Ahead

Confirming last week's report in the ASSEMBLY LINE that Ford's expansion plans are being carried ahead, the company announced that its $40,000,000 program is 92 per cent underway. Only the new blast furnace remains to be started, and preliminary work for that is already being done.

THE BULL OF THE WOODS — BY J. R. WILLIAMS


HE THOUGHT IT WAS ME THAT HIT HIM WITH A TOMATO, AN' HE WALKS OVER AN' BUSTS ME ONE--IT WAS HONKY HINES WHO THREW TH' TOMATO--I SEEN 'IM!
AND YOU DIDN'T STRIKE BACK AT HIM?
DEP D 14
THER'S A TOUCH OF SCORN IN TH' BULL'S TONE THERE--I WONDER WHY EVEN A BOSS DON'T LIKE A SQUEALER? THEY GET A LOT OF VALUABLE INFORMATION FROM SQUEALERS AND THEN HATE 'EM FOR IT!
WELL, IT'S TH' SAME WITH COPS--THEY'LL HAMMER A GUY TILL HE TALKS IN HIS SLEEP, AN THEN DESPISE HIM FER TALKIN'! IT MAKES 'EM SUCCESSFUL COPS AN' THEY HATE TH' BOYS WHO MADE 'EM A SUCCESS!
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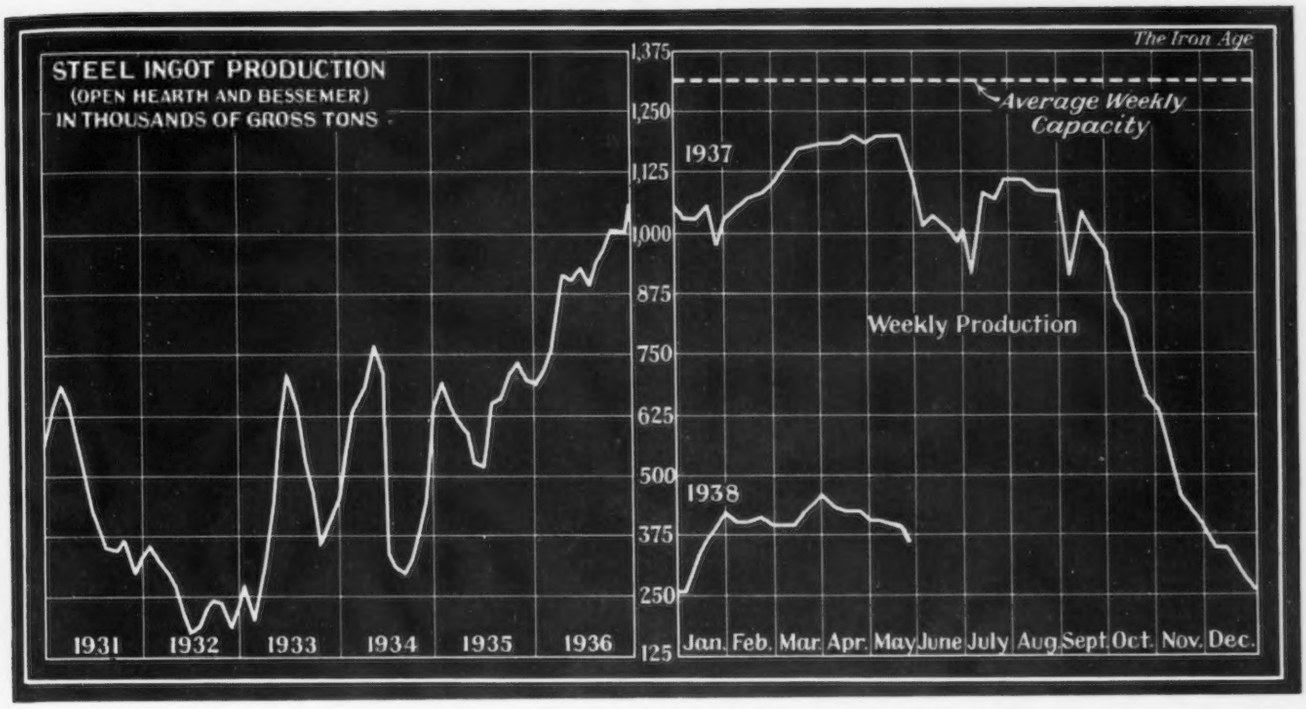
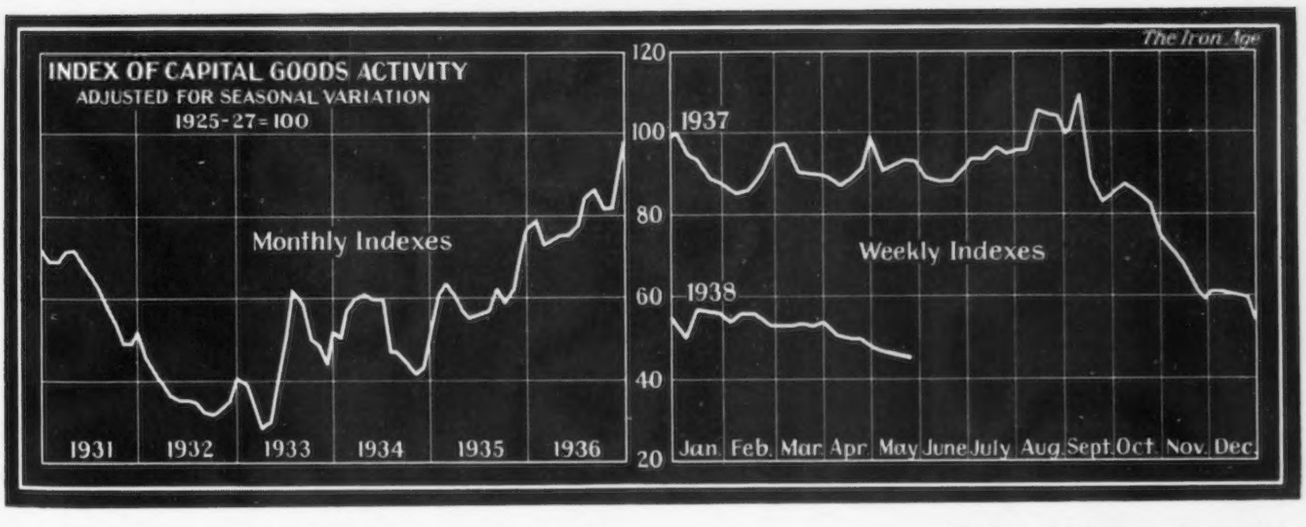
NICE PEOPLE
J.R.WILLIAMS 5-27

Steel Ingot Production Drops to 25 Per Cent



		Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Whe el-ing	Buffalo	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
District Ingot Production, Per Cent of Capacity	CURRENT WEEK...	18.0	23.0	19.0	21.0	24.0	47.0	21.5	19.5	52.0	40.0	30.0	42.0	10.0	**25.0**
	PREVIOUS WEEK..	22.0	28.5	24.0	26.0	16.0	54.0	21.5	19.5	48.0	40.0	30.0	37.5	10.0	**28.0**

Capital Goods Output Continues to Drift Lower



WITH every component of the index but the Pittsburgh series losing ground, a decline of 0.7 point was recorded by THE IRON AGE index for the week ended May 28. The increase in the Pittsburgh index was due mainly to a greater-than-seasonal rise in the volume of rail and water shipments. Industrial production in Pittsburgh was comparatively unchanged from the previous week. Despite a 28 per cent decline in the past week's volume of heavy construction awards, the cumulative total of awards for the year to date is 6.5 per cent above a similar period in 1937.

	Week Ended May 28	Week Ended May 21	Comparable Week 1937	Comparable Week 1929
Steel ingot production[1]	35.1	37.2	110.5	131.1
Automobile production[2]	39.2	40.1	114.8	109.9
Construction contracts[3]	61.1	61.8	58.8	125.2
Forest products carloadings[4]	45.9	46.7	74.0	111.2
Production and shipments, Pittsburgh District[5]	47.7	46.9	107.9	124.4
Combined index	**45.8**	**46.5**	**93.2**	**120.1**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record;* 4. Association of American Railroads; 5. University of Pittsburgh.

THIS WEEK IN WASHINGTON

. . . Riots ahead if U. S. spending flood continues, warns J. Hamilton Lewis, Democratic whip in Senate . . . New Deal's wage-hour bill, now in conference stage, finds road still rocky . . . House committee acts to broaden Labor Board's power to deal with firms taking Government business.

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON.—The national debt has reached the unprecedented dimensions of $37,500,000,000. The interest rate average is 2.56 per cent. Worked down to a painful refinement for the taxpayer this means that the interest charge is $30 a second. Scaling upward every time the minute hand completes its revolution, a charge of $1,800 has been accumulated. The hour hand completes its circle and a charge of $108,000 has been entered. Each time the earth rotates on its axis, a 24-hr. job, the interest piles up to $2,592,000. And every time the world completes its orbit, a 365-day job, the interest jumps to $928,054,400!

That sum is a levy at a rate of $7 against every man, woman and child in the United States simply to cover the cost of the money. And more billions are about to be tacked to the debt, some for relief and some as another artificial aid to business. Purportedly for those purposes only.

Big business is thumped for so-called high prices. High Government costs and altitudinous taxes, however, do not seem to worry the Washington powers-that-be in the least. On the contrary they seem to delight in them. They must. They keep raising the ante.

Every New Deal Year Red

Nevertheless, concern is beginning to be shown by Senators of the Administration's own party over Government policies of spending and the implications they present. Some of these Senators, unable longer to restrain themselves, have boldly charged political misuse of relief funds. Others, foregoing charges of this sort, have expressed grave apprehension over what lies ahead if a halt is not called on tremendous expenditures, and the outgo brought below the income, no sign of which appears on the budgetary horizon. Never has a New Deal year seen a balance written in black. Invariably the color has been red.

Revolution is an ugly, menacing word, yet it is fitted into the lexicon of United States Senators, whose party affiliations are with the Administration, in raising the danger signal because of government spending. The red light was flashed by no less a person than the Democratic whip in the Senate—J. Hamilton Lewis of Illinois—necessarily a warm supporter of the Administration, who rallies his colleagues when their votes on Administration measures are needed.

12,000,000 Are Supported

While definitely making no charges of misuse of funds, the debonair Senator did sound distinct alarm over the growing number of "dependents" supported by Government funds, which was estimated at 12,000,000 with a constant upward trend.

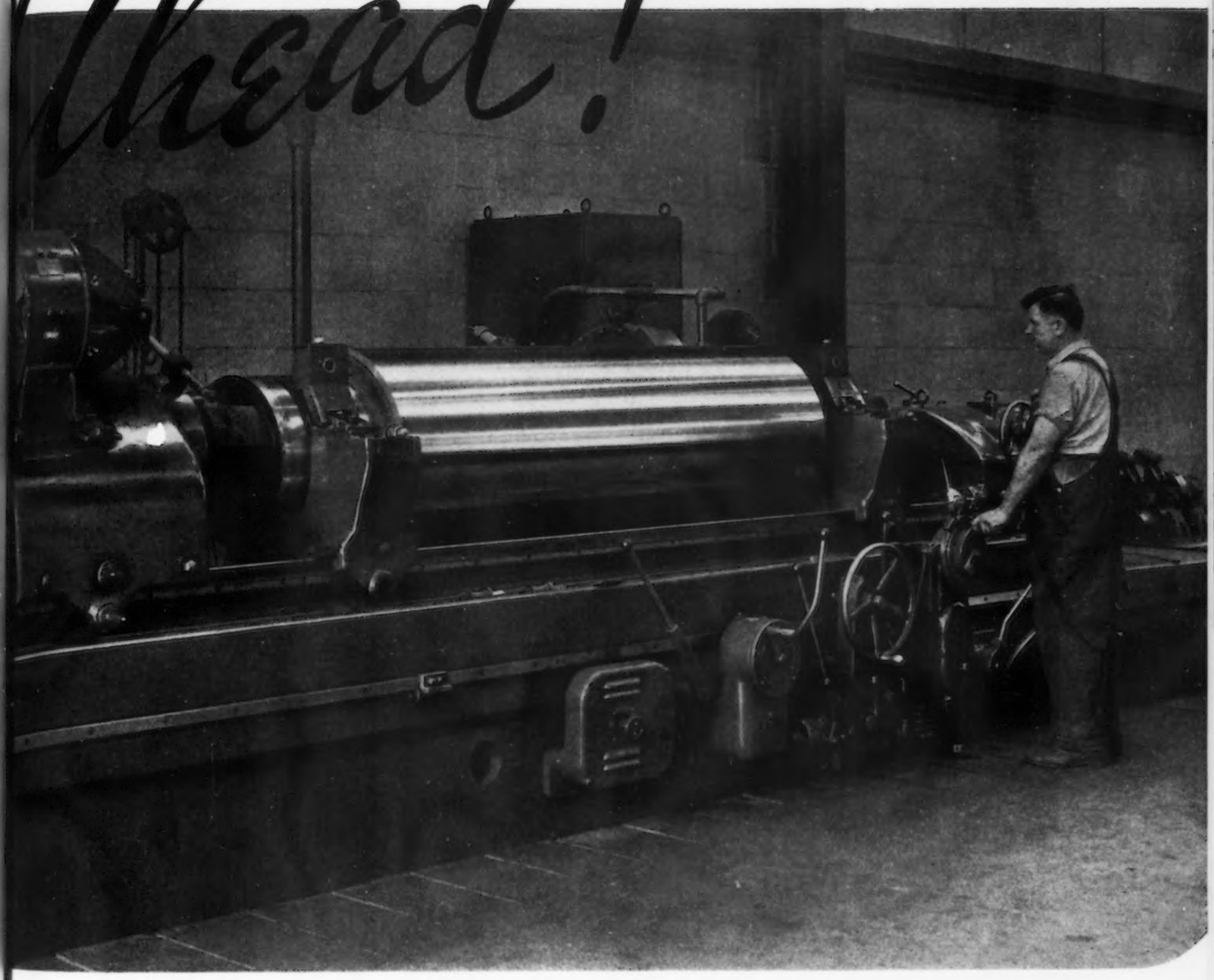
"This Government cannot continue this multiplication, and adding more and more to the dependent millions, then lead them to live upon those of mankind who are industrious, without having these beneficiaries feel as a conviction that they are privileged to feed on the Government and fatten on the industrious," warned the Senator.

Soon, the Senator declared, there will be a political revolt, "and from the political revolt we shall have internal insurrection, particularly in the large cities. From the insurrection we shall have rioting, and as a result of the rioting we shall be called upon to summon our constabulary to repress the rioting and violence. . . . We shall have war internal, which, though small in proportion to the population, will tend to depress securities, frighten the people, and attach to our communities the outrages of violence."

This is not inflammatory rhetoric of a soapbox agitator or of a political propagandist. It is the serious expression of a man in a highly responsible position, ordinarily, but not always, a potent member of the Administration's legislative family. No one more than he has the welfare of the family at heart. But unfortunately it is not likely that his wise counsel to its head will carry the slightest weight.

Yet business is barked at for its lack of confidence, the mainspring to recovery. It is even charged with "ingratitude" because it is opposed to the wild spending spree which is made the object of ridiculous Government press agent ballyhoo regarding its "stimulating" effect on business. Just why business should express "gratitude" for being taxed to the breaking point in order to place a few orders with itself is difficult to understand.

Ahead!"



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MILLING MACHINES *and* GRINDING MACHINES

Foes of Wage-Hour Bill Get Another Chance to Oppose It

WASHINGTON.—The Administration's wages and hour bill, battered from pillar to post for more than a year, reached the conference stage last week after the House gave its approval by a vote of 314 to 97 to its own version and after Senator Harrison, Democrat, of Mississippi, outstanding opponent of the House draft, forecast that some kind of a wage-hour bill was inevitable.

Harrison, who apparently holds the key to the bill's future on the Senate side, successfully maneuvered to have two Southern Senators named to the conference committee and indicated that even though they were unable to preserve geographical differentials, as provided in the Senate draft, another chance will be given on the floor to oppose the bill after it returns from conference. He emphatically denied he had threatened a filibuster.

40-40 Standard Is Goal

The Senate measure, which passed the upper house last session and represents a slightly modified version of the original Black-Connery bill, would delegate power to a five-man administrative board to establish in various industries working standards approaching as near as possible a 40-40 ratio of minimum wages and maximum hours. In general, such wage floors and hour ceilings have not been opposed by industry but business spokesmen have directed their criticism to the board's power which is largely discretionary and which permits it to conduct "snooping expeditions" even though the company involved might be paying wages far in excess of the designated minimum and in other ways exempt from the wage-hour law.

The House bill, however, lays down a rigid pattern for all interstate business, provides a minimum wage of 25c. an hr., and a maximum work-week of 44 hr. as a starting point with automatic improvement in these standards over a three-year period until the 40-40 ratio is attained as the national standard. The secretary of labor would administer the law. Senate and House conferees must compose these differences before favorable action can be taken on the program. There was every indication that Southern differentials would have to be included in a committee-approved draft before the Senate would vote in favor of the conference report.

Passage of Bill Doubtful

Another move to expand the power of the NLRB to cover firms doing business with the government was made last week when a sub-committee of the House Judiciary Committee recommended passage of the Wagner-Healey bill. Despite this action, however, chances for passage seemed remote in view of recent action on the Senate side when the Education and Labor Committee revised the Wagner draft, eliminating any additional powers for the Labor Board so that persistent violators of the Wagner Act

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would find their name "blacklisted" and denied Government business.

Also during the week Remington-Rand employees' council petitioned the Supreme Court for review of a lower court decision upholding the Labor Board's order to reinstate 4000 former striking employees. A similar plea by attorneys for the company itself was denied by the Supreme Court on May 23. The independent labor organization called the board's order "without warrant and erroneous" and complained that reinstatement of the strikers would force the dismissal of an equal number of workers whose "only offense is a failure to join the union favored by the board."

Sen. Thomas Urges Scrap Licensing Bills be Tabled

WASHINGTON.—While spokesmen for the Independent Iron and Steel Producers' Committee on Scrap and the Scrap Iron and Steel Institute aired conflicting views on restricted scrap exports at a National Purchasing Agents convention last week in St. Louis, scrap licensing legislation became a dead issue in Congress, for this session at least, when Senator Thomas, Democrat, of Utah, recommended to the Senate Military Affairs Committee that it take no further action on the pending bills.

The Senator, who is chairman of the sub-committee which handled the proposals and which conducted a public hearing on the question early in April, told THE IRON AGE that arguments presented by both sides in the controversy were too inconclusive to serve as a basis for legislative action.

Advocates Control of Exports

He observed also that there now appears to be plenty of scrap available and that prices have dropped considerably since a scrap iron and steel licensing plan was first proposed last year.

It was his view, however, that the sub-committee's time in studying the proposed legislation was well spent since "it paved the way for the broader bill"—his strategic and critical material conservation measure. That bill, the Senator said, marks the first time the Government departments concerned have united in approving and drafting a bill to store war materials and take precautionary steps to preserve domestic supplies.

At the St. Louis convention, Robert W. Wolcott, president of Lukens Steel Co., and chairman of the steel scrap committee, told the iron and steel buyers meeting that his group desired an intelligent control of scrap exports and that if exports had been curtailed last year, foreign countries producing finished steel with the help of American scrap would have purchased more semi-finished and finished steel in this country. He pointed out that the estimated 4,000,000 tons of scrap exported last year plus the heavy shipments of previous years have deprived United States workers of millions of man-hours of employment.

Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel countered with the statement that handling and preparing scrap for export gives employment to 100,000 workers.

PRECISION to less than .001 inch

● Horsburgh & Scott Worms are ground within an accuracy of .001" in lead, indexing and contour . . . a precision in manufacturing that insures higher efficiency, longer life and quieter operation. To obtain these exceedingly close limits, this company developed its own exclusive grinding machines. These machines plus precision inspection fixtures are your guarantee of the finest worms and gears possible.

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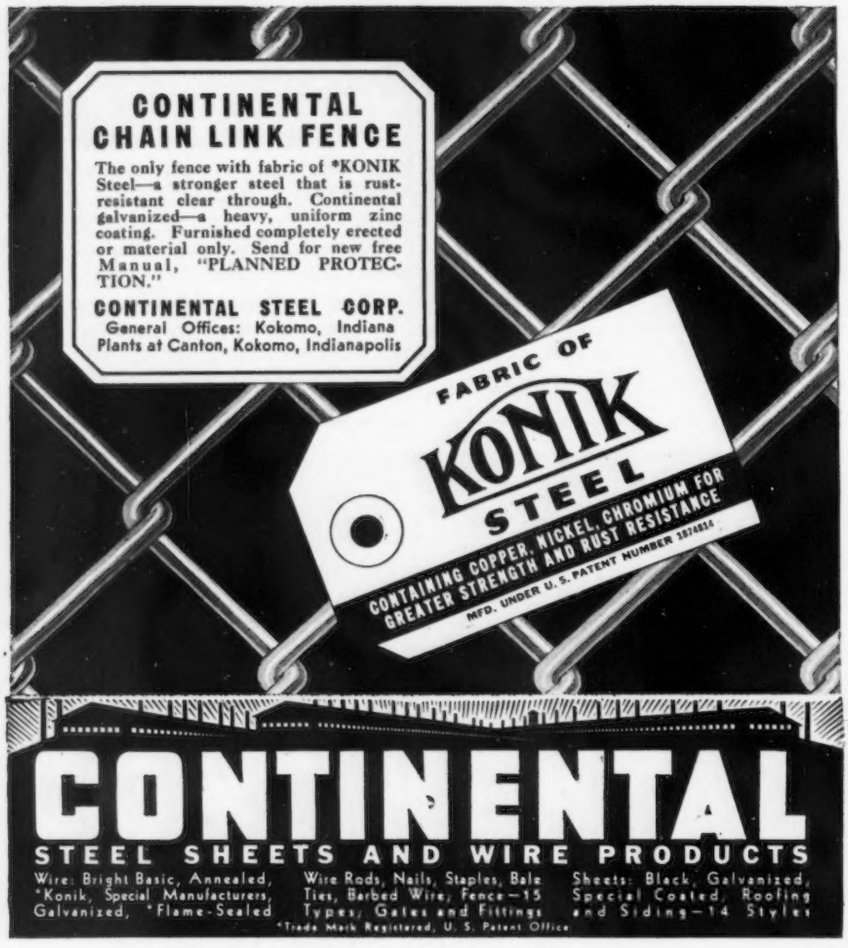
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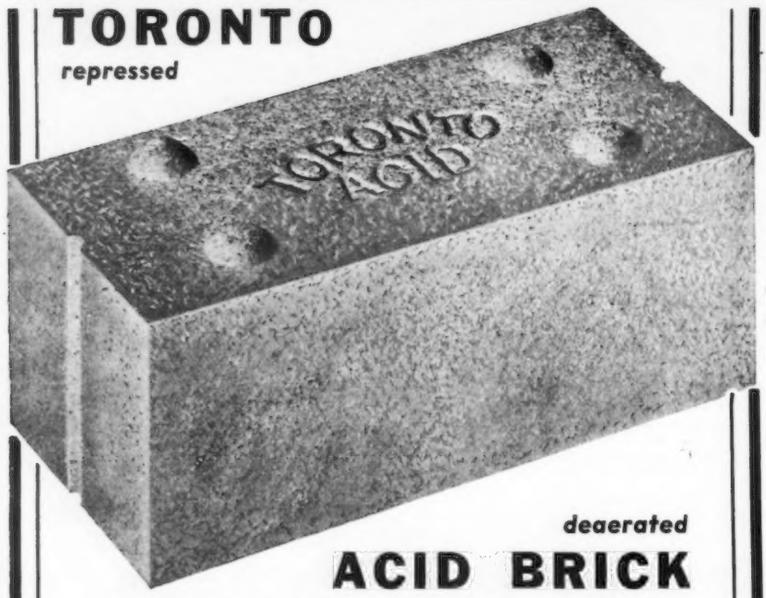
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Fire Clay, Acid Resistant Brick, Fire Clay Mill Brick, Pickling Tank Linings, Acid Proof Construction, Paving Brick, Paving Block, Chimney Stack Brick.

..PERSONALS..

ROSS L. LEFFLER, formerly manager of industrial relations, Pittsburgh district, Carnegie-Illinois Steel Corp., has been appointed director of industrial relations and GEORGE P. WARDLEY, who has been superintendent of industrial relations at the South Chicago works, has been made assistant director of industrial relations. Mr. Leffler will make his headquarters in Pittsburgh and Mr. Wardley will remain in Chicago.

Mr. Leffler has been identified with Carnegie-Illinois and its predecessor, Carnegie Steel Co. since 1910, when he entered the Duquesne works as a time taker. After serving in various positions at Duquesne, including rolling mill superintendent and superintendent of personnel, Mr. Leffler was appointed manager of industrial relations in the Pittsburgh district in 1935.

R. L. LEFFLER

Mr. Wardley began his service record with United States Steel Corp. subsidiaries in 1907, with the H. C. Frick Coke Co. He worked successively in supervisory capacities at the Joliet, Ill., coke by-product plant and South Chicago plants of the former Illinois Steel Co. until his present appointment.

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ROBERT H. HEYER, metallurgist in the research laboratories of the American Rolling Mill Co., Middletown, Ohio, is to receive the Charles B. Dudley medal of the American So-

ciety for Testing Materials at the 1938 meeting of the society this month at Atlantic City because his paper "Analysis of the Brinnel Hardness Test" offered at the society's 1937 meeting was "an outstanding contribution in the field of research. Mr. Heyer was formerly an instructor in metallurgy at Purdue University.

❖ ❖ ❖

L. B. KEELER, personnel director of the Hudson Motor Car Co., has been elected president of the Detroit Chapter of the Society for the Advancement of Management, succeeding E. S. SMITH, of the Fisher Body Corp. He will be assisted through

G. P. WARDLEY

the next year by DONALD J. SUBLETTE, of the Detroit Civil Service Commission, who was reelected, and STANLEY R. SAUNDERS, of the American Forging & Socket Co., Pontiac, who was elected to replace Mr. Keeler as vice-president.

❖ ❖ ❖

BURNETT BEAR has been appointed manager of the Cleveland fabricating contracting division of Bethlehem Steel Co., succeeding the late Ernest Sprague. Following graduation from Cornell, in 1922 with a degree in civil engineering, Mr. Bear became affiliated with McClintic-Marshall Corp., and when the company was taken over by Bethlehem in 1931 he became assistant contracting manager at Cleveland for Bethlehem.

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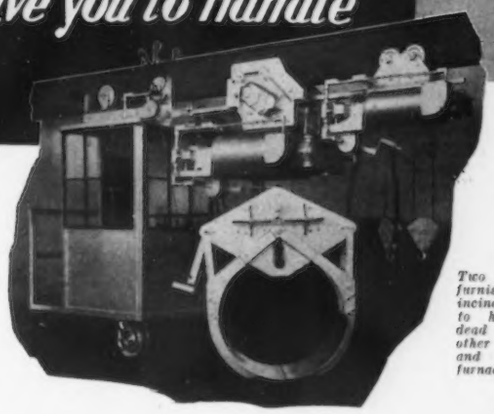
CHARLES M. WHITE, vice-president in charge of operations, Republic

"DEAD HORSES or what have you to handle"?



Two hoists were furnished for the incinerator, one to handle the dead animal, the other to remove and replace the furnace cover.

DESCRIBE your handling problem, be it ordinary or special, and we will cooperate with you in trying to find a satisfactory, economical solution.

You know, better than anyone else, the specific requirements of your industry. We know, based on over 30 years' experience, what is and what is not practicable in crane and hoist engineering. Let us work it out together.

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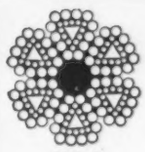
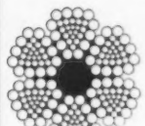
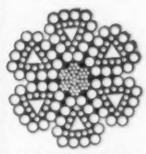


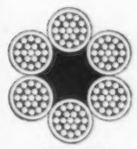
Style B Flattened Strand



"8" Flattened Strand



Wire Rope Center



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There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close cooperation with users.

–PREFORMED–

For maximum efficiency in Preformed Wire Rope, use Preformed "HERCULES". It is available in both Round Strand and Flattened Strand constructions.

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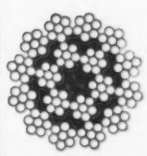
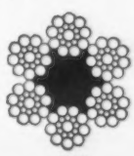
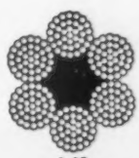


18x7 Non-Rotating

6x19 Filler Wire

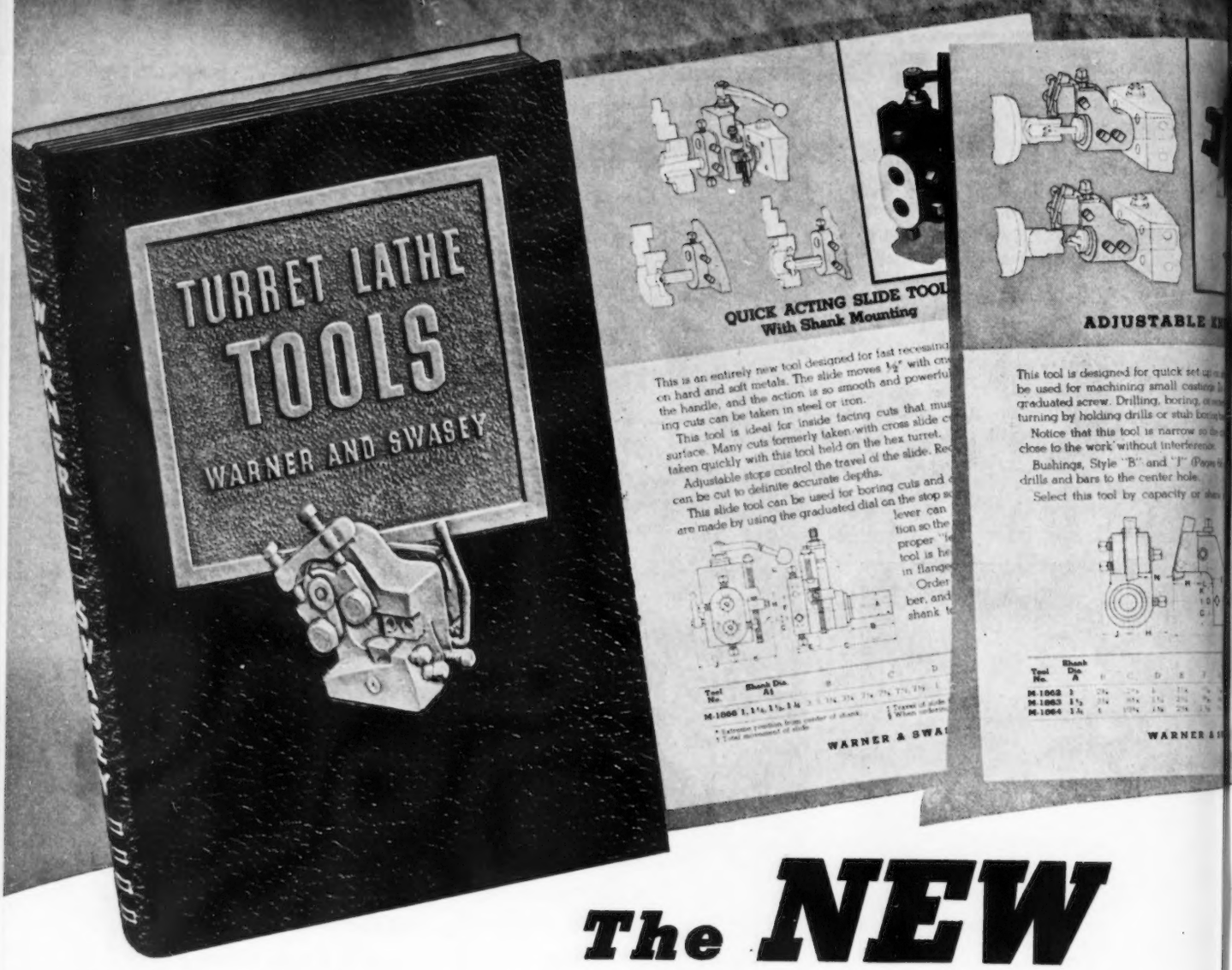


6x19 Seale



6x37 Extra Flexible

8x19 Extra Flexible



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Warner & Swasey Turret Lathe Tool Catalog and Manual Now Ready for Distribution

Would you like to know the answers to questions such as these?

1. Can you use larger cutters to take heavier cuts?
2. Can you adapt your turret lathes better for small lot work?
3. How can you reduce set-up time?
4. Can you do heavier jobs on your present turret lathes?
5. Can you use more standard tools instead of special designs?
6. Can these tools handle more than one job?
7. How can you better use carbide cutters on your turret lathes?
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YOU'LL FIND THE ANSWERS TO THESE QUESTIONS AND A LOT MORE IN THE NEW WARNER & SWASEY TOOL CATALOG!

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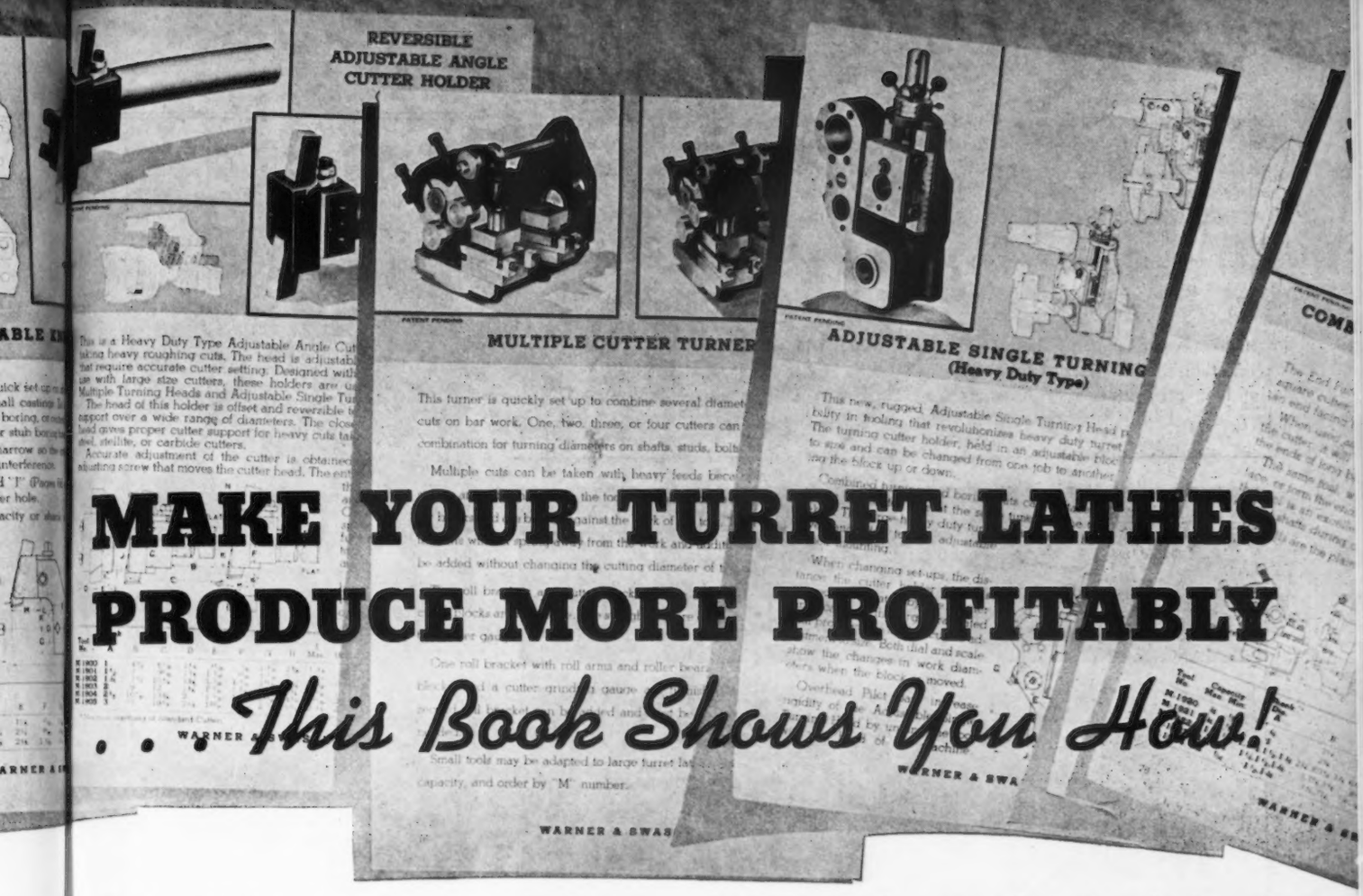

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. . . *This Book Shows You How!*

For over fifty years we have built turret lathes. We know the metal turning problems of thousands of companies. All this experience is behind this new line of Warner & Swasey Tools –the most complete, and up-to-date line of turret lathe tools in the world!

This book of 176 pages, covers 596 turret lathe tools. Some have never before been available as a standard tool. Many standard tools have been improved and redesigned to take full advantage of the latest developments in cutting steels. Other tools are completely new types!

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Turret Lathes

Steel Corp., last week was given the American Iron and Steel Institute medal awarded annually to the author of what is judged the outstanding technical paper of the prior year's convention. Mr. White's paper was on "Technological Advances in Steel Production."

❖ ❖ ❖

GEORGE A. HIGGINS has been appointed assistant manager of sales of the bar, strip and semi-finished materials division, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Higgins has been with the company since 1919 and prior to his present appointment was assistant manager of sales, Pittsburgh district.

❖ ❖ ❖

GEORGE P. HOWELL, for 17 years director of purchases for the Seaman Body Corp., has been made district manager of the strip steel division of the Acme Steel Co., Chicago, for Wisconsin and upper Michigan. Previously he was purchasing agent for

CHARLES M. WHITE

Buick Motors Co. and Nash Motors Co. He is a former president of the Milwaukee Association of Purchasing Agents and a former director of the National Association of Purchasing Agents. He will make his headquarters in the Guaranty Building, Milwaukee.

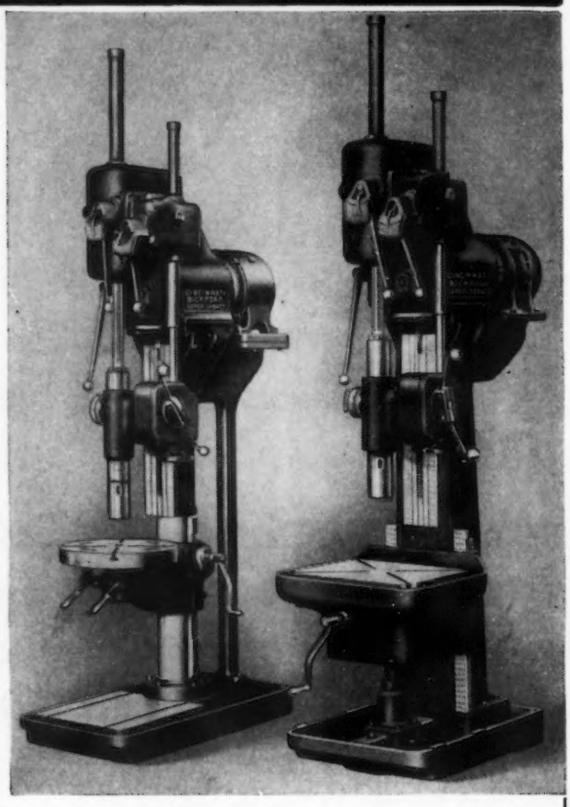
❖ ❖ ❖

C. M. WILSON has been made district manager of the General Electric Co. in New England. Mr. Wilson

G. A. HIGGINS

All geared 21" 24" and 28"
SUPER SERVICE UPRIGHTS

More holes per dollar



Select a Super Service Upright and provide your man with an up-to-the-minute machine that does everything but think. Incorporated in Super Service Drills are ease of control, speed, accuracy and long life. Less effort is required of operators.

Driving motors are direct-connected; bearings are of ball or roller construction; gearing is heat treated alloy steel; table arm controls are at the front. And the net result, in terms of your work, is MORE HOLES PER DOLLAR.

THE CINCINNATI BICKFORD TOOL CO., Oakley, Cincinnati, Ohio, U.S.A.

CINCINNATI BICKFORD

attended Dartmouth College, specializing in business administration in post graduate courses. He was first with Pierce Phelps, Inc., and eventually sales manager. In 1925 he joined the General Electric Co. as radio sales manager of the Eastern seaboard

G. P. HOWELL

out of Philadelphia and later at Bridgeport, Conn.

❖ ❖ ❖

W. J. HARVEY has been appointed district sales representative of Jones & Laughlin Steel Corp.'s new sales office at 600 North Second St., Harrisburg, Pa. This is to be a sub-office of the Philadelphia district sales division. Mr. Harvey has represented Jones & Laughlin in that territory since 1925 and has been with the corporation since 1910.

R. G. SCOGGINS has been appointed sales representative in the Roanoke, Va., territory and will cover western Virginia, western North Carolina and northeastern Tennessee. Mr. Scoggins was previously associated with T. A. Loving & Co. of Goldboro, N. C., as construction engineer and superintendent of constructions.

E. E. CONREY has been appointed sales representative at Richmond, Va., and will cover eastern Virginia and eastern North Carolina. Mr. Conrey has been associated with Ohio and Indiana steel manufacturers for the past several years.

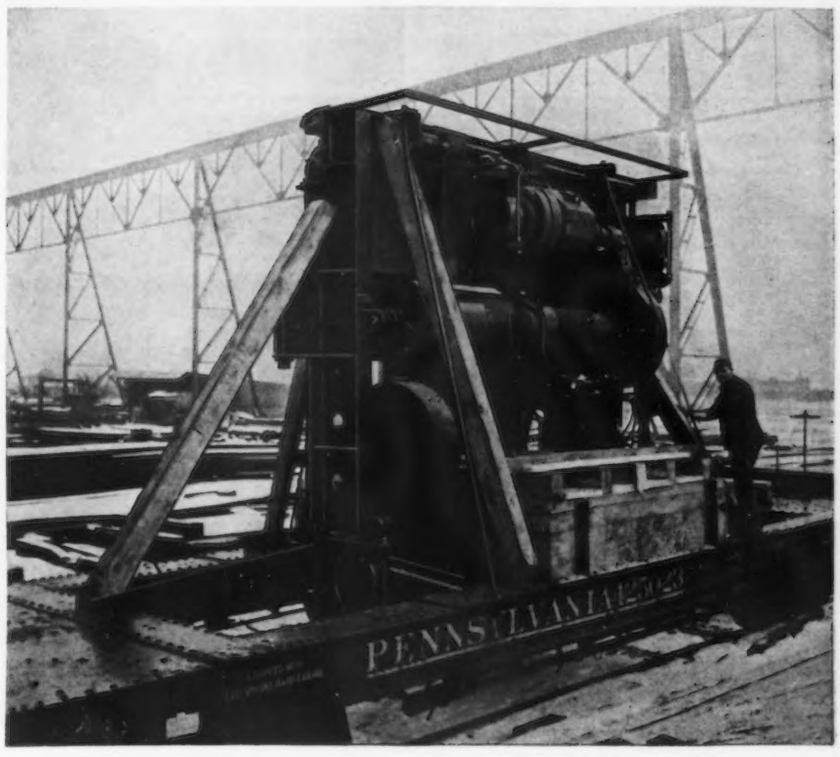
BERT MORLEY, for 27 years vice-president and sales manager for Kelsey-Hayes Wheel Co., Detroit, has resigned to become sales manager for the Ferro Stamping & Mfg. Co., Detroit.

Ryan Secures Large Stainless Parts Order

AN order for stainless steel airplane engine exhaust collector rings and exhaust tail pipes has been awarded the Ryan Aeronautical Co., San Diego, Calif., for the latest type army bombing planes. The contract calls for approximately 500 complete ring assemblies and more than 400 exhaust pipes, and the amount involved in the contract is about $100,000. More than 66,000 lb. of stainless steel will be used to fill the contract. The number of individual parts to be stamped is approximately 68,000 and welded seams will total more than seven miles in length.

CLEVELAND CRANES

All Welded for Every Industry



● It was necessary to ship this one piece 30 ton, 12 foot spread trolley in a "well car" in order to meet railroad clearance requirements. Just one of the many special problems involved in giving our customers the low operating costs of one piece units.

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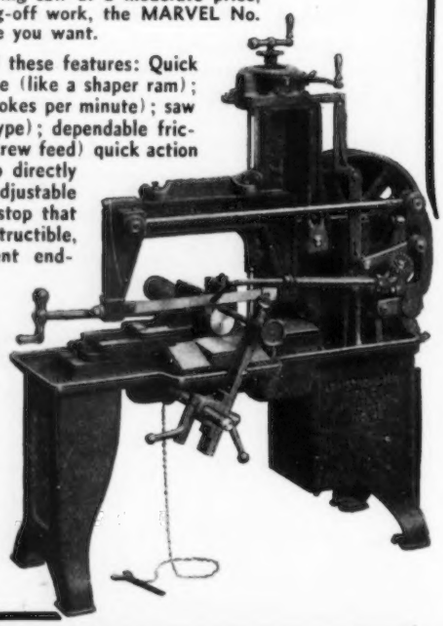
MARVEL

Speed at a Low Price

Outcuts all hack saws and band saws in its price class.

If you are looking for a really fast cutting saw at a moderate price, for your general run-of-the-shop cutting-off work, the MARVEL No. 4B High Speed Hack Saw is the machine you want.

No other general-purpose saw offers all these features: Quick return of saw blade on non-cutting stroke (like a shaper ram); high speed (will run smoothly at 150 strokes per minute); saw blade always horizontal (not "tilting" type); dependable friction screw-feed (also convenient hand screw feed) quick action vise; reliable plunger-type coolant pump directly connected without belt or gears; adjustable height and depth stop-cams; automatic stop that also stops the motor; simple, indestructible, clamping type blade holders; convenient end-gauge; can be set to run saw blade up and down continuously for quick chucking operations; most economical to operate; and now equipped with anti-friction ball bearings in saw frame slide that assures a rigid saw frame without wear, without friction.



Available in belt drive, single speed or 4-speed; motor drive single speed, 2-speed, or 4-speed; with either open-leg base as illustrated, or with full cabinet base.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5749 BLOOMINGDALE AVE., CHICAGO, U.S.A.

Quicker

Cleaner

Lower Cost

Pipe Cutting . . . .

with this remarkable

RIDGID

Wheel-Blade Cutter

Because every RIDGID tool is designed to save you bother and expense old fashioned tools cause you, the millions of them now in use have saved billions of hours that used to be wasted.

That's true of this cutter. The thin bladed wheel—coined out of tool steel, hammered, heat-treated and assembled in a solid hub—has the extra stamina to keep on rolling readily, cleanly through all kinds of pipe long after ordinary cutter wheels need replacing. And the housing is guaranteed warp-proof — always cuts true, twirls easily to your pipe size.

Try this tool of the smart buyer and the expert user. Save yourself time and expense with the RIDGID Cutter that gives you far more cuts per wheel-blade. Buy from your Jobber—now.

THE RIDGE TOOL CO., Elyria, Ohio

RIDGID PIPE TOOLS

CIO Dues Collectors Jailed in Case Tie-Up

CHICAGO.—For violating an injunction restraining them from denying employees free access to the plant of the J. I. Case Co., in Rockford, Ill., five local officials of the United Automobile Workers of America, a CIO affiliate, were fined and sentenced to jail recently for contempt of court. The circuit court judge said, "Workers are losing money, their families are suffering, the factory is suffering, the butcher and grocer and everyone in the town is suffering as a result of this dispute."

About 1500 men have been idle since the management closed the plant April 25 following the refusal of UAW collectors to allow any but dues paid members to enter the plant.

Following a picket line battle Monday morning at which several were injured, a CIO mass meeting voted not to interfere further with men desiring to work and sent a bargaining committee to the management when the plant opened Tuesday.

T.C.I. Sends Tin Plate Shipment to West Coast

TENNESSEE COAL, IRON & RAILROAD CO. has started movement of a shipment of 3850 tons of tin plate to the Pacific Coast, the first consigned from the new Birmingham plant for transportation by rail and water to factories in that area. The order has been sent by rail from Birmingham to Mobile, to be loaded aboard the Isthmian Lines' steamer *Mobile City*.

Distribution of the shipment will be among plants of the American Can Co. in Sacramento, Oakland, San Jose and Los Angeles, Cal.; Portland, Ore., and Seattle, Wash.

Ensley Rail Mill Will Shut Down Soon

BIRMINGHAM, May 31.—Buying of iron and steel is unimproved. The iron market is particularly dull. Steel is only fair.

Six blast furnaces are operating. Last week 12 open hearths were operated and this week 13 are scheduled.

The Ensley rail mill will close some time during the first half of June.

Nashville Bridge Co. was low bidder for a State highway bridge in Jefferson County, bidding $51,990.

Structural Welding Progress in Germany

(CONTINUED FROM PAGE 35)

No butt weld of this type is allowed to pass without being X-rayed and it may give an idea of the volume of work in hand that about 1000 ft. of welds are being X-rayed every day in Germany.[8] A number of mobile plants are mainly used for this purpose.

Very high figures for shrinkage stresses were found with welded plate girders which were recently erected. In one case 12.7 tons per sq. in. was measured, and in another case of a rigid frame corner the shrinkage stresses even amounted to 16.5 tons per sq. in., the latter figure being twice as high as the permissible working stress and already in the neighborhood of the yield point. Fortunately enough it was proved that these shrinkage stresses are not dangerous and only of little importance to the resistance of the girder.[9] In no case were these shrinkage stresses superimposed by stresses owing to dead and live load, which was also proved by interesting experiments.

Special Plate Girder Flange Sections Developed

In the course of the development of all-welded bridges, based on the ever increasing experience gained by fatigue tests, a number of special sections for plate girder flanges were introduced on a large scale. Several types of them are already rolled in great quantities for the exclusive use with all-welded structures. One of these flange sections had already reached a production of 15,000 tons up to the beginning of 1936. It may be expected that these developments have not yet come to an end. There is much scope for new ideas regarding the details of welded joints in buildings and bridges. They look quite different now than a few years ago and it will need further progress mainly in the direction of design. Research and practical experience in recent years have cleared the way.

[8] Second Congress, Berlin, 1936, International Association for Bridge and Structural Engineering.
[9] G. Schaper, Bautechnik, Jan. 1, 1937.

Republic Steel Corp. directors, meeting May 25, took no action with respect to payment of dividends on July 1, 1938, on the 6 per cent cumulative convertible prior preference stock, Series A, and on the 6 per cent cumulative convertible preferred stock.

STANDARD
S.A.E. ALLOY STEELS
IN STOCK

For those who prefer standard numbered steels we have

2315	3130	4340	6150
2320	3135	4345	X4130(Aircraft)
4615	3140	4350	4140
4620	3145	6145	4150

For those who wish to take advantage of constant metallurgical improvement and development long before they are incorporated in S.A.E. standards, or where close selection of material for analysis, grain size, control and quality is desired, we offer

ALLOY HY-TEN GRADES

THE HY-TEN OF TODAY IS THE STANDARD STEEL OF TOMORROW

"A"1X	"B"2	"B"4	"B"43
"A"15	"B"3X	"B"5	"M" Temper

Rounds Squares Flats — BARS and FORGINGS — Hexagons Octagons

Warehouses CAMBRIDGE CLEVELAND CHICAGO

WHEELOCK, LOVEJOY & CO., INC.
Send for Data Sheets

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The KEY to Lower Cutting Costs

WELLS Metal Cutting BAND SAWS

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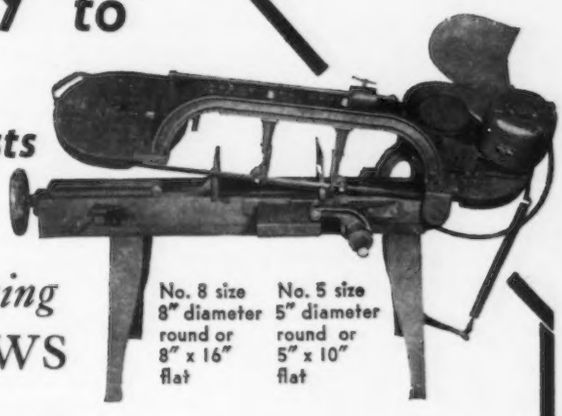

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. . . THE NEWS IN BRIEF . . .

Otis Steel Co. modernizes strip mill at Cleveland.—**Page 54.**

▪

Steel Institute hears discussions of way to bring business recovery.—**Page 56.**

▪

Release the flow of capital into production channels of private enterprise, says Tom M. Girdler.—**Page 56.**

▪

Steel industry must begin a broadgage campaign to explain its aims, its policies and its methods to American people, says Ernest T. Weir.—**Page 56.**

▪

General Johnson charges that steel prices are too "sticky" and must be reduced and asserts that the entire steel industry must bargain collectively.—**Page 56.**

▪

We are now tasting the bitter fruit growing from the fallacy of trying to boost income, output and employment by increasing costs, says Tom M. Girdler.—**Page 59.**

▪

Ford shutdown for week to cut auto assembly total about 12,000 units.—**Page 60.**

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General Motors reports 4.9 per cent drop in foreign sales.—**Page 60.**

Leaf Spring Institute devoted to study of improvements for autos.—**Page 60.**

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Auto industry taking increasing interest in machine design.—**Page 62.**

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Capital goods output continues to drift lower.—**Page 63.**

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Riots ahead if U. S. spending continues, warns J. Hamilton Lewis, Democratic whip in Senate.—**Page 64.**

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Foes of wage-hour bill, now in conference stage, get another chance to oppose it.—**Page 66.**

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Labor Board's power to deal with firms taking Government business broadened.—**Page 66.**

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Senator Thomas urges scrap licensing bills be labeled.—**Page 67.**

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CIO dues collectors jailed in Case tie-up.—**Page 74.**

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T.C.I sends tin plate shipments to West Coast.—**Page 74.**

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Metal trades executives discuss labor-management relations.—**Page 78.**

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What the CIO has done in "Michigan" was told in address at N.M.T.A. by Congressman Clare E. Hoffman.—**Page 81.**

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Death of Erskine Hewitt recalls early iron mining.—**Page 83.**

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U. S. orders Koppers gates for Grand Coulee Dam.—**Page 84.**

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Six arsenals can meet only 10 per cent of Army needs, says Assistant Secretary of War.—**Page 85.**

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Ferro Enamel Corp. builds new frit-making plant.—**Page 85.**

Supreme Court rules against Republic Steel in Wagner Act case and Labor Board plans for reopening.—**Page 86.**

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Edgar Thomson slabbing mill seen by 200 at Youngstown.—**Page 86.**

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SWOC members accept pay cut at Greensburg, Pa.; reject similar reduction at Kewanee, Ill., plant.—**Page 87.**

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Resistance Welder Manufacturers Association members will meet June 9 in Detroit to hear committee reports on industry betterment.—**Page 87.**

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Atlantic Refining starts $270,000 improvement program, awards contracts for four tanks.—**Page 87.**

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Charles R. Hook, American Rolling Mill Company president, warns against bill by which U. S. would take over the steel industry.—**Page 87.**

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Machine tool sales dragging in most sections, but foreign demand is sustaining factory output.—**Page 109.**

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Westinghouse's $12,000,000 appropriation will go for machinery.—**Page 109.**

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CONVENTIONS

June 12 to 17—Society of Automotive Engineers, White Sulphur Springs, W. Va.

June 13 to 15—American Electro-Platers' Association, Milwaukee.

June 20 to 24—American Society Mechanical Engineers, St. Louis.

June 27 to July 1—American Society for Testing Materials, Atlantic City, N. J.

Sept. 26 to 30—Association of Iron and Steel Engineers, Cleveland.

Oct. 10 to 14—American Institute of Steel Construction, French Lick Springs, Ind.

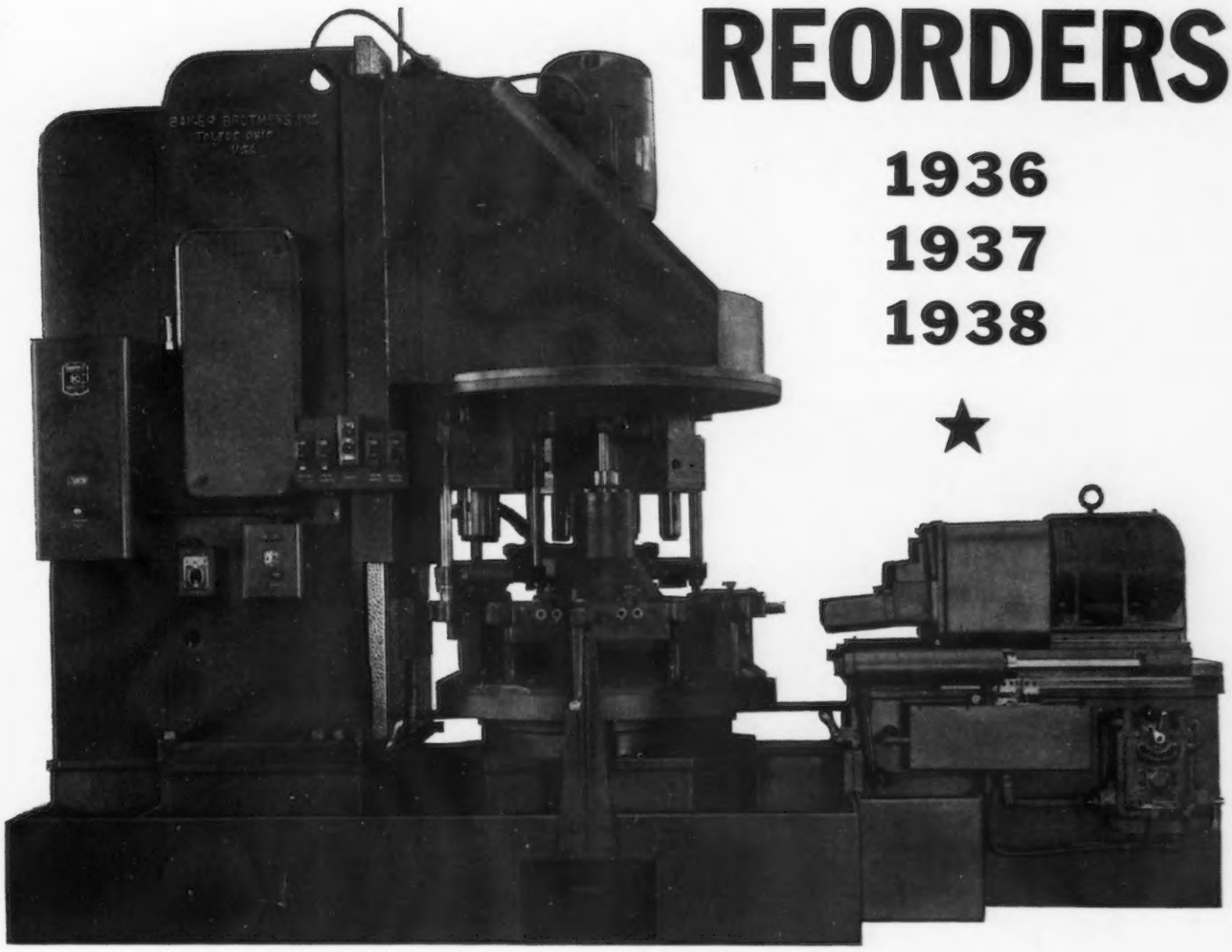
Oct. 12 to 15—The Electrochemical Society, Rochester, N. Y.

Oct. 17 to 21—National Metals Congress, Detroit.

REORDERS

1936
1937
1938

★



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Metal Trades Executives Discuss Labor-Management Relations

THE 40th annual convention of the National Metal Trades Association, held May 25 and 26 at the Hotel Biltmore, New York, was attended by over 300 members who heard prominent speakers in industry and government discuss labor-management relations.

At the business session on Thursday the following officers were elected: President, N. W. Pickering, Farrel-Birmingham Co., Inc., Ansonia, Conn.; first vice-president, A. H. Timmerman, Wagner Electric Corp., St. Louis; second vice-president and treasurer, Roe S. Clark, Package Machinery Co., Springfield, Mass. The following were elected to serve as councilors for two years: R. W. Gillispie, Jeffrey Mfg. Co., Columbus, Ohio; George A. Seyler, Lunkenheimer Co., Cincinnati; Harold S. Falk, Falk Corp., Milwaukee; R. H. Goodwillie, Otis Elevator Co., Yonkers, N. Y.; D. N. Benedict, Frick Co., Waynesboro, Pa., and C. H. Strawbridge, Goodman Mfg. Co., Chicago. Louis Ruthenburg, Servel, Inc., Evansville, Ind., was elected to the council to fill an unexpired term.

Speaking at the Wednesday session, Harold F. Browne, director of the Industrial Management Division of the National Industrial Conference Board, struck the theme of the convention when he stated that "We have come to the close of one period of industrial relations and we are embarking on a new one, and industry must adjust itself to the new conditions which prevail at present."

The typical worker of today, Mr. Browne said, is more highly educated than the worker of a few years ago. He is more aware of happenings outside the plant he is employed in, and the radio and the automobile have widened his contacts with outside groups. This change in labor, the speaker declared, requires a change in the methods used by management in dealing with labor.

Another development of recent times that is of special significance to industry is the increasing spread of foreign doctrines antagonistic to the American system of free enterprise. Mr. Browne suggested that industry should combat these doctrines by removing the fear of insecurity that dominates workers today by endeavoring to stabilize employment. Another line of action proposed by Mr. Browne, was that of disseminating the truth concerning industry. Labor is being continually bombarded with propaganda derogatory to management's interests and the speaker expressed the thought that it was about time that management took steps to defend itself.

Labor-Management Meetings Valuable

Another speaker at the Wednesday session, C. S. Craigmile, Belden Mfg. Co., Chicago, explained the method used by his company to bring em-

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ployees and supervisors together around a common table to discuss problems affecting plant and wage conditions. In 1933, Mr. Craigmile said, the company experimented with this type conference, and the early meetings proved so successful that they have been held regularly ever since. These meetings are arranged by departmental groups and attendance is limited to 50 at each meeting. In addition to discussing rates and working conditions, the company's financial reports are also discussed, and an effort is made to have each employee understand the significance of these reports and their bearing on his welfare.

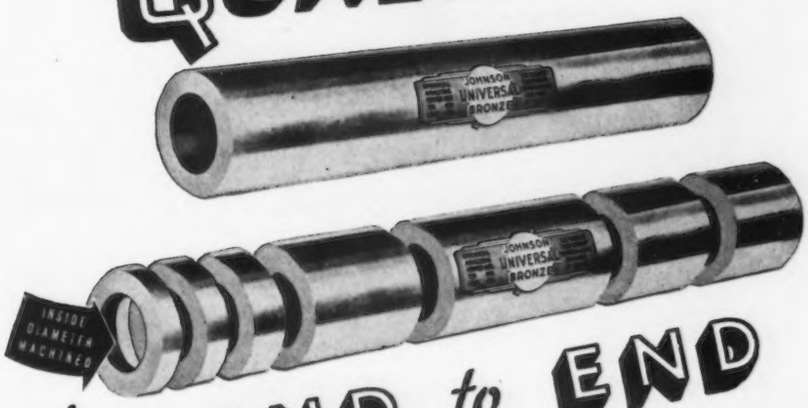
N. W. PICKERING, Farrel-Birmingham Co., Inc., Ansonia, Conn., new president of the National Metal Trades Association.

Mr. Craigmile stated that is was his experience that in addition to providing a means of settling small grievances before they grew to dangerous proportions, these meetings also served to bring the interests of the two groups closer together and many valuable suggestions directed to the betterment of production methods had emanated from these conferences.

C. C. Winegardner, Diamond Chain & Mfg. Co., Indianapolis, spoke briefly on "How We Handle Our Employees." Industry, Mr. Winegardner said, must deal with machines, materials and labor, and of these three items, labor is by far the most important. With this thought in mind, the chain company inaugurated in 1920 a personnel plan directed toward creating a closer bond between the plant management and plant employees. Mr. Winegardner expressed his agreement with the thoughts of the previous speaker, C. S. Craigmile, that these meetings, if properly organized, are of inestimable value in uniting labor-management interests.

The personnel plan used by the Diamond company is under the supervision of a personnel department that acts only in an advisory capacity. It has no administrative powers. This department endeavors to establish contact with every worker in the plant at regular intervals and in these contacts tries to impress upon the worker the fact that the management is interested in his welfare and is ready to adjust any reasonable grievance. One activity of this plan that

QUALITY



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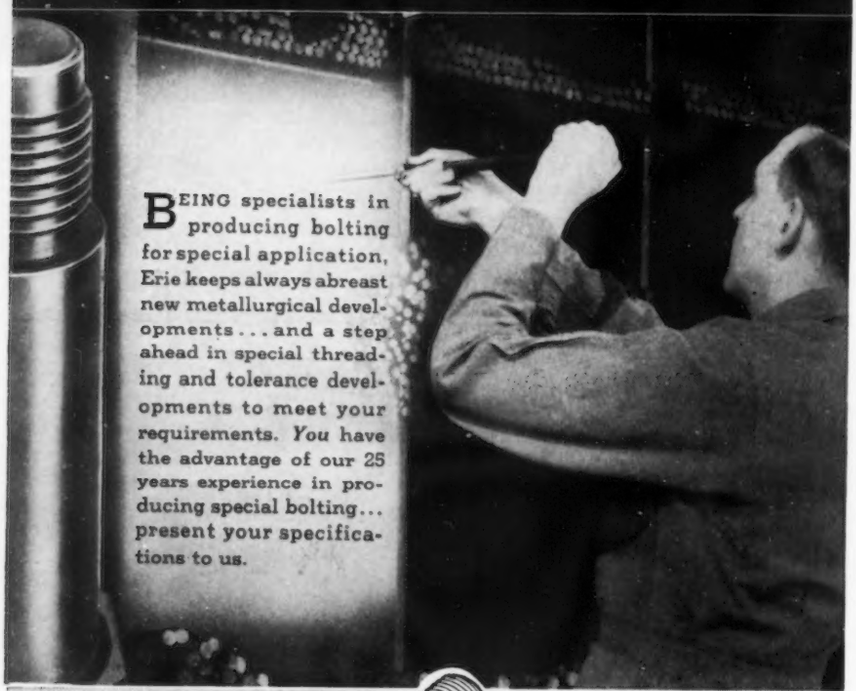

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At the Thursday morning session, Allen W. Rucker, Eddy-Rucker Nickels Co., Cambridge, Mass., spoke on "Restoring the Control of Wages and Working Hours to Management." America, Mr. Rucker declared, is at the crossroads of bureaucracy and free enterprise and the path that is finally chosen will rest in a large degree upon the actions of industry. If management can evolve a program of wage control shy of arbitrary conditions, it can win the support of all labor and safeguard the American system of free enterprise.

As a means of achieving this end Mr. Rucker proposed that labor be given a definite percentage of the value added to the product as group compensation, this share to be distributed among the workers according to the method now used by industry to rate the value of each individual's activity.

With a plan of this nature there could be no argument as to whether or not labor was receiving fair compensation, the speaker contended, and at the same time it would eliminate arbitrary decisions relating to wages and would remove false suspicions when wage adjustments were necessary. Such a plan, Mr. Rucker felt, would provide labor with an incentive to assist management in promoting efficient production.

Job Evaluation

Following Mr. Rucker's address, the report of the N.M.T.A. committee on job evaluation was presented by O. D. Reich of Dexter Folder Co., Pearl River, N. Y., committee chairman. The report stressed the need for greater effort in standardizing job evaluation methods, particularly with reference to defining specialized jobs. Much work along these lines has been done by the individual chapters, the report stated, and a summation of these activities will be presented by the committee in the near future.

Mr. Reich called upon S. H. Burk of Atlantic Refining Co., Philadelphia, and D. W. Weed of General Electric Co., Schenectady, N. Y., to discuss their experience with job evaluation. Mr. Burk said that it was his experience that the success of evaluation plans depended upon the utilization of a scientific approach to all attempts at evaluation, as haphazard approaches do more damage than good. Mr. Weed expressed him-

self as being amazed at the ease with which such plans can be operated, once they are under way. The plan employed by the General Electric Co. has been in operation for many years and is based essentially on an exact definition of certain "key" jobs. The value of other jobs is based on their relationship to these key jobs. This plan, Mr. Weed said, has been very successful from the viewpoint of both labor and management.

The Eleventh Commandment

"What the CIO Has Done to Michigan" was the title of an address delivered to the convention on Thursday afternoon by Clare E. Hoffman, Congressman from Michigan. Praising the automobile industry for its dominant part in starting the march to recovery in 1936, Mr. Hoffman bemoaned the fact that it should be in the power of one small group, the CIO, to completely undo all the constructive work of the industry. Employment and wages in Detroit were at an all-time high and Detroit was contented, the Congressman said, until the CIO "invaded" the town. Although the union represented only 10 per cent of Detroit's workers, Mr. Hoffman said, they were able to tie up the entire city and disorganize the industry. The failure of Federal or State authorities to protect the rights of workers that wanted to work should not be forgotten, he said.

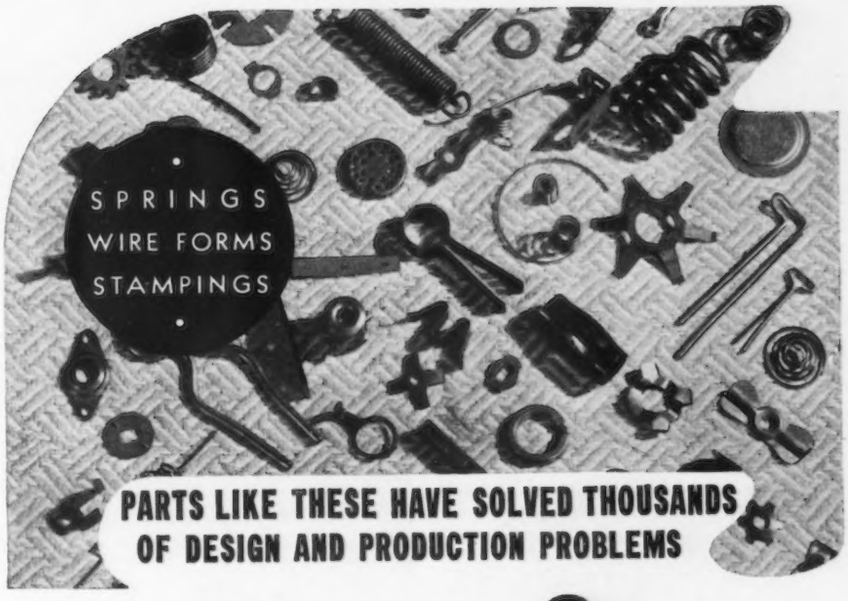
"John L. Lewis," the Congressman declared, "has added to the 'Ten Commandments' an eleventh which is 'that in America thou shalt not work without the consent of the CIO and the payment of dues imposed by it.'"

Colonel W. T. Chevalier, vice-president, McGraw-Hill Publishing Co., New York, who also spoke at the afternoon session, stressed the need of establishing a balance between the production of capital goods and consumer goods.

"The consumer goods industry must merchandize more aggressively than ever and must intensify its search for consumer outlets," Mr. Chevalier said, "in order that the industry may take full advantage of the equipment provided by the capital goods maker."

At the banquet Thursday evening at the Hotel Biltmore, Josiah W. Bailey, Senator from North Carolina, spoke on "Government, Industry and Recovery."

Business is today under an intense, well-organized attack, the Senator declared, and business must clean out



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the "chiselers and dishonest business men" in order to give honest business men a chance to pull the country out of the present recession. "Peace must be declared," he said, "between Government and business, so that business may expand and our unemployed absorbed."

Commenting on sitdown strikes, Senator Bailey said, "Only when the power of our armed forces were exhausted, would I, if I were President, give in to a sitdown strike."

Other speakers at the convention were W. E. Odom, William Odom Associates, Chicago; Frederick Snyder, lecturer-publicist, Kingston, N. Y.; David R. Clarke, Fyffe & Clarke, Chicago; T. J. Morton, Jr., Hoosier Lamp & Stamping Corp., Evansville, Ind.; Charles C. McGehee, Federal Housing Administration, Washington; P. C. Jones, S. M. Jones Co., Toledo, and C. Wayland Brooks, Chicago attorney.

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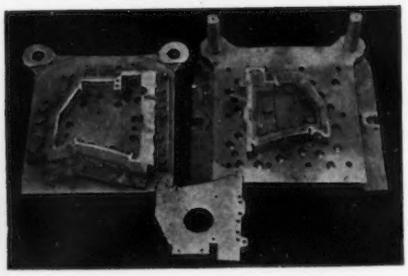

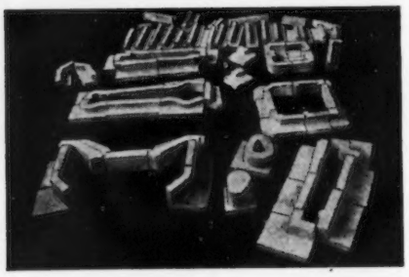

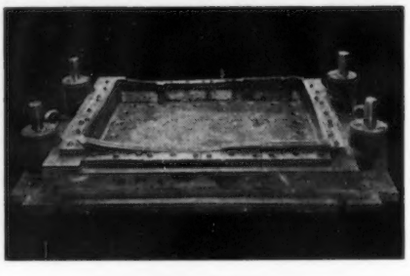

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...OBITUARY...

THOMAS H. TAYLOR, former Eastern sales manager of the American Steel & Wire Co., Cleveland, died at his home in Higganum, Conn., on May 21, aged 82 years. He was associated with the Steel & Wire company from its formation in 1899 until 1922 when he retired. For most of this period he had the position of assistant general sales agent at the New York office in complete charge of the Eastern sales district including all the Atlantic States from Maine to Florida and westward to Buffalo and Pittsburgh. He originally entered the steel business with the Washburn & Moen Co. in Chicago.

❖ ❖ ❖

R. C. LEWIS, manager of the rolling mill sales division for the Farrell-Birmingham Co., Ansonia, Conn., was killed in the airplane crash near Cleveland, May 24. Previously he had been connected with the engineering department as division engineer in charge of engineering of rolling mills, metal-working machinery, roll grinders and other heavy equipment.

❖ ❖ ❖

C. LAMONT SCHOONOVER, president and general manager of the Warren Tool Corp., Warren, Ohio, died at his home May 23 from a heart attack.

❖ ❖ ❖

C. F. LICKEL, New York, official of the Barboon Welding Co., was killed in the airplane crash near Cleveland on May 24.

❖ ❖ ❖

GEORGE E. ROEHM, of Bloomfield Hills, Mich., former secretary of the Hupp Motor Car Co. and chairman of the board of Motors Metal Mfg. Co., died of a heart attack, May 27, at the Shoepac Club, Onaway, Mich., where he had gone for the week end. He was 73 years old. Mr. Roehm was a graduate of the engineering school of the University of Michigan, getting his degree in 1887. Subsequently he was employed by the Michigan Central Railroad, the Milwaukee Bridge Co., the Detroit Bridge & Iron Works and was construction engineer of the Canadian Bridge Co. He retired three years ago.

❖ ❖ ❖

JAMES W. GIER, for 25 years purchasing director of the Motor Wheel Corp., Lansing, Mich., died May 20 in a Chicago hospital. Mr. Gier formerly had held similar posts with the

Gier Pressed Steel Co., and the Gier-Dale Co. He was 64 years old.

❖ ❖ ❖

JOSEPH LEMONT, who was identified with the Tennessee Coal, Iron & Railroad Co. for 32 years before his retirement, died at his home in Birmingham on May 6, aged 88 years.

❖ ❖ ❖

HENRY A. DEFRIES, since 1930 special representative and sales engineer in Cleveland for the Ludlum Steel Co., Watervliet, N. Y., died at his home in that city recently, at the age of 55 years. He had been identified with the company for 15 years.

❖ ❖ ❖

JOHN D. MAURER, since 1922 general superintendent of the Illinois Steel Co. at Milwaukee, died on May 21, aged 55 years. He was born in Cleveland and joined the Illinois firm at Milwaukee in 1906.

Death of Erskine Hewitt Recalls Early Iron Mining

ERSKINE HEWITT, president of the Ringwood Co. and a member of the executive committee of the International Business Machines Corp., died on May 22 at the age of 67. He was also an officer of many other companies, including the Gauley Mountain Coal Co. His name and his passing calls to mind a prominent family and an interesting bit of history of iron mining in northern New Jersey. The name Erskine, besides being a place name on the map of the State, is in memory of Robert Erskine, a Scotch mining engineer who was brought to America and took over the operations of the first Ringwood Co. in 1771 after it had been brought to the point of failure by Baron Peter Hasenclever. Iron ore had been discovered in the Ramapo Mountains of New Jersey in 1739 by a prospector named Cornelius Board, who set up a small furnace not far from the present site of Ringwood Manor (a recent gift to the State of New Jersey by Erskine Hewitt). Capitalists from New York and Newark bought out Board and later sold the ore properties and furnaces to an English syndicate in London, known as the American Iron Co. The name was later changed to the Ringwood Co., after the Ringwood forest in England.

Baron Hasenclever became managing director of the company in 1765. He was a Bavarian mining engineer. Because the mines and smelter failed to make sufficient money, the directors recalled Hasenclever to England, where he was arrested and tried, but acquitted of malfeasance and mismanagement of the property.

When the American Revolution broke out, Robert Erskine threw his fortune and furnaces into the cause. As Surveyor General to George Washington, he not only mapped roads along the Atlantic seaboard, but forged iron for wagon wheels, cannon balls, and other military supplies. Erskine, incidentally, was the first to use magnetic separation in the concentration of his ore at Ringwood. He died in 1780.

His widow, Mrs. Erskine, later married a Major Hooper, whose mismanagement of the mines and furnaces resulted in the property being offered for sale by the State and county from 1793 on. Production continued, however, and was at the rate of 450 tons of pig iron annually. There were no

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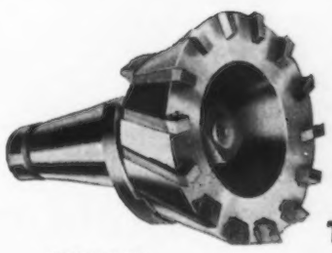

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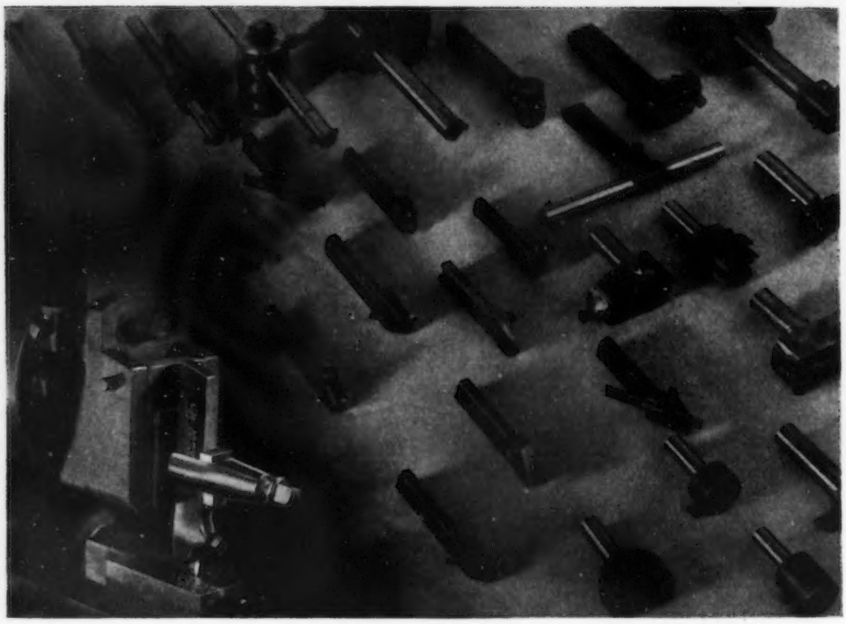
GAIR-LOCK BORING BARS AND MILLING CUTTERS -- SHELL, SIDE, FACE, INTERLOCKING, ALTERNATE TOOTH AND MULTIPLE DIAMETER

buyers until 1807 when Martin Ryerson, a well established ironmonger, took over the property and developed its production extensively. Upon his death in 1839, activity at the furnaces again declined in the hands of his two sons.

The history of modern Ringwood begins in 1853 with the acquisition of the thousands of acres of the Ringwood tract by Peter Cooper, the grandfather of the late Erskine Hewitt and one of America's first truly great iron masters. Even then Peter Cooper was past the prime of life and the management of the company largely rested in the hands of his son-in-law, Abram Stevens Hewitt, who restored the mines and furnaces, and who eventually became mayor of New York City. Later, from 1875 on, a number of blast furnace and steel fabricating firms were formed in the vicinity of Trenton and Camden, N. J., known under the names, Cooper & Hewitt Co., New Jersey Iron & Steel Co., and New Jersey Iron Co. Around 1900 these companies were acquired by the syndicate headed by J. P. Morgan that eventually formed the United States Steel Corp.

Following the death of Abram Hewitt in 1903, the present Ringwood Co. was formed in 1905 by his widow, whose son, Erskine Hewitt, had actively headed it until his recent death. The mines have been worked continuously up until 1931, when the last operating unit, the Cannon mine, was closed down upon the expiration of long term contracts. This mine is being maintained dry, however, and will be reopened when market conditions are favorable. All the other mines are flooded.

ARMSTRONG



Make "unprofitable" work profitable with **ARMSTRONG TOOL HOLDERS**

Narrowing profits and limited volume are teaching us to do unprofitable work profitably, to cut costs by producing more per hour and by eliminating unnecessary risks and errors. These "brass tack" times have been marked by the passing of haphazard tooling and tools. Close figuring leads to fact finding and more universal knowledge of costs is ending the use of single purpose forged tools for standard operations on lathes, planers, slotters and shapers. To be in line today, such work must be done with ARMSTRONG TOOL HOLDERS that: "Save All Forging, 70% Grinding and 90% High Speed Steel".

Because cost figuring must be close and tool performance certain, shops and plants everywhere are adopting the complete ARMSTRONG System . . . are using ARMSTRONG TOOL HOLDERS for all operations. With these permanent multi-purpose tools, each efficiently designed for its special work, they are stepping up cutting speeds, increasing feeds; are stepping up output and stepping down cutting costs . . . are doing "unprofitable" work at a profit.

If you are having trouble showing profit in your machine shop or tool room insist that needless tool forging and tool dressing be eliminated, and that the ARMSTRONG System of Tool Holders be adopted all the way.

Write for catalog, or submit any unusual cutting problem for recommendations.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

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ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

U. S. Orders Koppers Gates for Grand Coulee

THE United States Department of the Interior, Denver, has ordered 36 24-in. gate valves from Koppers Co.'s Western gas division, Fort Wayne, Ind., to be installed in the Grand Coulee Dam, State of Washington. All valves are to be of cast steel with 18 of them chain operated and 18 motor operated.

This company has also received an order from the city of Chicago for eight 10 x 10 ft. sluice gates to be installed in the Chicago river controlling works of the city's sanitary district. Motor operated mechanisms and cast iron guides also are to be provided for each gate.

Inland Asks Court to Drop NLRB Complaint

CHICAGO.—Inland Steel Co. has filed with the judges of the Circuit Court of Appeals a cross-petition asking that the entire complaint of the Labor Board against the company be dismissed. Inland claims that since the board has announced the withdrawal of its order for the company to bargain exclusively and sign an agreement with the SWOC that the court should disregard the company's original petition seeking a review of the case, and dismiss the entire complaint.

Whalen-Howe, electro plating, 226 West Adams Street, Syracuse, N. Y., succeeds Whalen-Noxon Lamp Corp. of same address. New company specializes in plating of chromium on aluminum.

Six Arsenals Can Meet Only 10% Of Army Needs, Official Says

CHICAGO.—Fully 90 per cent of the Army's war-time requirements will have to be supplied by private industry, Louis Johnson, Assistant Secretary of War, last week told members of the Army Ordnance Association, Chicago chapter of the A.S.M.E., and a group of machinery manufacturers and their representatives, at Rock Island Arsenal, Rock Island, Ill.

Only 10 per cent can be manufactured by the six Government arsenals, thus plans for industrial mobilization in time of war are being made by the War Department and legislation is before Congress now, Mr. Johnson said, to permit the placing of "educational orders" by the department with those manufacturers whose work requires the aids of gages, special tools, and dies, so that industrial organization may be speeded.

Arsenal Developed "Honing"

The speaker brought out that the machining process known as "honing" was developed during the war at Rock Island Arsenal in connection with building recoil mechanisms for French 75 mm. guns, and that the arsenal also introduced the mechanical polishing of piston rods.

A display of products turned out by the arsenal attracted 500 machinery, tractor and steel men. Twenty-six exhibition booths on the main floor of the manufacturing building demonstrated the scope of the arsenal's activities and included displays of such departments as the pattern and foundry department, milling, grinding and lathes, rifle and machine gun repair department, shell forging, tool manufacturing, tank assembly, gun carriages, sheet metal, honing and lapping, turret lathe, welding, apprentice school, smith, forge and heat treating department, and many others.

The purpose of the exhibition was to acquaint members of the ordnance association and manufacturers with the type of materials that will be necessary in case of a future war, particularly in the case of the ammunition display.

A field demonstration, displaying the army's newest types of mechanized cavalry, armored cars, and tanks, ended the anniversary celebration.

Ferro Enamel Builds New Frit-Making Plant

PORCELAIN enamel frit is now being produced by the Endless-Flow process at the plant of the Ferro Enamel Corp. in Cleveland. The company has built a large new storage and mixing building, an intricate conveyor system, four patented continuous smelters and a large finished storage warehouse for storing the finished frit.

A Safe, Speedy Job at Minimum Cost

That is the record of the Tiger crane in all types of shops, whether for handling structural steel in shipyards or for plate glass. It is what a Tiger saves in operating cost over a longer period of life that makes it the best materials-handling investment.

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Edgar Thomson Slabbing Mill Seen by 200 at Youngstown

YOUNGSTOWN.—More than 200 steel executives and technicians last week visited United Engineering & Foundry Co.'s Youngstown plant, where the new 45 x 80 in. slabbing mill stand and its vertical edger for Carnegie-Illinois Steel Corp.'s Edgar Thomson plant were set up for inspection. This mill will have an annual capacity of more than 1,000,000 tons and will furnish slabs for the new Irvin works in addition to regular blooms for other uses.

The slabber will handle up to 45,000 lb. of ingots conveyed by motorized ingot car to a turntable and weighing machine. Scales and turntable will operate so that the weight is automatically registered and either end of the ingot can be headed toward the rolls.

Beyond the approach tables will be two horizontal rolls measuring 45 x 80 in., each driven by a 5000-hp. motor. Two vertical rolls are also part of the slabber and measure 36 in. in diameter. They will be driven by a combination of beveled gear and single helical spur gears. Both vertical rolls are driven by a 3000-hp. reversing motor.

Electrically controlled manipulators will be provided on both sides of the mill. For quick roll changing a motor-operated changing device will be installed. Instead of the conventional practice of keying the drive gears direct to the rolls, the drives for the vertical rolls form separate units which will allow an exceptionally quick and easy change.

Also part of the new installation is a recently developed up-and-down cut shears which will handle up to 8 x 60 in. slabs. Both mill tables, the manipulator, the screw-downs and the shears are equipped with Ward-Leonard controls.

The new slabbing mill is being shipped to Edgar Thomson where erection will be begun immediately. Operations will be well under way by the time the Irvin Works begins to roll strip.

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● Jobs that require welding in all positions—overhead, vertical and horizontal—jobs that must stand rigid inspection and meet high strength requirements—jobs that must be put through in limited time—are handled to best advantage with Page Hi-Tensile "C" Electrodes.

Hi-Tensile "C" has speeded up many jobs, reduced many cost records. It is a quiet, steady electrode that causes very little spatter and slag loss. Used with greatest convenience and efficiency when work must be done in close quarters. Adaptable to production, maintenance and repair work.

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Supreme Court Rules Against Republic

WASHINGTON.—The Supreme Court this week overturned a circuit court order preventing the Labor Board from reopening its Wagner Act case against Republic Steel Corp. and then issuing a new order regarding rehiring of striking employees by that company.

To Republic's contention it was aggrieved by the board's attempt to regain jurisdiction of the case, the Supreme Court majority ruled that the act grants relief only to persons aggrieved by a board order and that had the lower court not restrained the board the order against Republic would have been vacated. At Labor Board offices it was said the board expects to issue new findings, conclusions and a further order in Republic as well as in the Ford Motor Co. case.

In another decision the Supreme Court this week declined the Government's request for a rehearing in the Kansas City stockyards case and declared that absence of an examiner's report might be permissible if in all other respects the principle of "fair play" had been followed by a U. S. quasi-judicial agency.

Wheeling Steel Corp., Wheeling, W. Va., declared a dividend of $1.25 on the $5 cumulative convertible prior preferred stock, and $1.50 on the 6 per cent preferred stock, both payable July 1 to stockholders of record June 14. Time for exchange of 6 per cent preferred stock under the plan of recapitalization was extended until the close of business on Sept. 14.

Welder Association In Detroit June 9

MEMBERS of the Resistance Welder Manufacturers Association will meet June 9 at the Recess Club, Detroit, to hear reports to be made by committees appointed by Walter A. Anderson, Taylor-Winfield Corp. president, and including a committee on standards consisting of John D. Gordon, Taylor-Winfield Corp., chairman; Harold B. Warren, Thomas-Gibb Electric Welding Co.; Arthur B. Sonnenborn, Federal Machine & Welder Co., and Mr. Anderson.

A committee on standard transformer specifications, headed by H. V. Beronius, of Welding Machines Mfg. Co., includes E. C. Smith, of National Electric Welding Machines Co.; M. S. Clark, of Federal Machine & Welder Co., and Mr. Anderson. Floyd E. Taylor, Swift Electric Welder Co., is membership committee chairman, and Mr. Sonnenborn, publicity committee chairman. H. R. Rinehart, 505 Arch Street, Philadelphia, is assistant secretary-treasurer of the association.

SWOC Members Accept, Reject Cuts in Wages

A MAJORITY of SWOC members in the Walworth Co.'s Greensburg, Pa., plant have voted to accept an 11 per cent pay cut after union members at the same company's Kewanee, Ill., plant rejected a similar reduction and called a strike. The Greensburg vote was satisfactory "from the viewpoint of continued operations," a Walworth official said.

Atlantic Refining Starts $270,000 Storage Program

ATLANTIC REFINING CO. early this month will start erection of a 750,000-gal. tank at New Haven, Conn., a 725,000-gal. tank at Kettle Point, R. I., two all-welded tanks of 1,120,000-gal. capacity each at Newark, N. J., and will enlarge its docking facilities at Newark. Total cost is $270,000. Chicago Bridge & Iron Co. have the tank contracts.

Koppers Co., western gas division, Fort Wayne, Ind., has been awarded two construction contracts by Sinclair Refining Co., New York. The contracts are for a riveted and weld-caulked, water sealed gas holder, a sweating tank, three open-top rundown tanks and two hot water tanks, to be used in the refining company's East Chicago, Ind., refinery.

Hook Warns of Bill Nationalizing Steel

A CARDINAL point in industry's program for recovery is revision of the Wagner Act into a workable instrument for curtailing labor disputes, Charles R. Hook, president of American Rolling Mill Co., told the Chicago Association of Commerce on June 1.

Answering claims that industry has no recovery plans with a detailed list of steps which would encourage private enterprise and bring recovery, Mr. Hook declared that a "return to sound economic reasoning and a commonsense diagnosis is the sure solution to the problems of America today."

Warning of government control of business, Mr. Hook referred to a House measure introduced May 3 by Congressman Teigan of Minnesota. "It could happen here," the Armco official said after reading the title of the Teigan bill which is:

"A bill to provide for the acquisition by the Federal Government and the public ownership and operation of the iron and steel industry of the United States of America."

Wyckoff Drawn Steel Co., Pittsburgh, with mills at Ambridge, Pa., and Chicago, announces it has added to its standard service Leadloy in all standard S.A.E. analyses.

Do you do any plating or cleaning by acid-dip?

Then this FREE Bulletin should be in your hands . . .

In this 8-page bulletin are descriptions and illustrations of the two Duriron Heat Exchangers, with curves of the capacities at different rates of flow with steam pressures up to 75 lbs. sq. in.

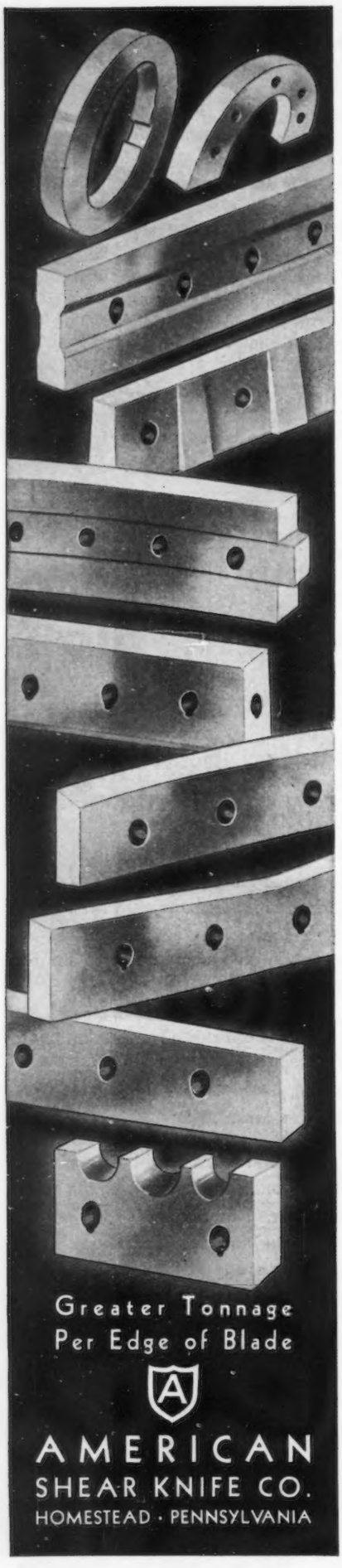
Given is a formula for figuring heat requirements and the size and number of heat exchangers needed for any size tank.

Illustrated is a brand-new portable heating and filtering unit for use with still tanks. This consists of a Duriron pump, Duriron Heat Exchanger, Duriron valves and fittings and a filter press, all on a caster truck.

If you do any heating of corrosive solutions, you will be interested in looking over this bulletin. We shall be glad to send you a copy.

Other heating equipment is shown, such as Duriron Steam Jets, Heating and Cooling Coils and Immersion Tubes.

THE DURIRON COMPANY, Inc.
438 N. Findlay Street Dayton, Ohio



FABRICATED STEEL

. . . Lettings decline to 6525 tons from 12,200 tons last week . . . New projects higher at 17,900 tons . . . Plate awards total 3010 tons.

NORTH ATLANTIC STATES

AWARDS

1650 Tons, New York, approach to George Washington bridge, to Bethlehem Steel Co., Bethlehem, Pa.

345 Tons, Cuba, N. Y., grade and high school, to R. S. McMannus Steel Construction Co., Buffalo.

325 Tons, Tionesta, Pa., dam tunnel ribs, to Commercial Shearing & Stamping Co., Youngstown, Ohio.

300 Tons, New York, Fulton Fish Market, to Lehigh Structural Steel Co., Allentown, Pa.

280 Tons, New York, curb angles for Procurement Division, Treasury Department, to American Bridge Co., Pittsburgh.

270 Tons, Pine City, N. Y., State highway bridges, to American Bridge Co., Pittsburgh.

250 Tons, Bennington, Vt., State highway bridge, to American Bridge Co.

230 Tons, Gardiner, N. Y., State bridge, to Ingalls Iron Works Co., Birmingham.

195 Tons, John Hohenadal Brewery bottling house, to Fort Pitt Bridge Works Co., Pittsburgh.

185 Tons, Devon, Conn., repairs to bridge 48.50, to Berlin Construction Co., Springfield, Mass.

170 Tons, Singerly, Md., State bridge over Baltimore & Ohio Railroad, to Bethlehem Steel Co., Bethlehem, Pa.

170 Tons, Rushville, N. Y., grade and high school, to Ernst Iron Works, Buffalo.

140 Tons, Carney's Point, N. J., Y.M.C.A. building, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

125 Tons, Chenango County, N. Y., State bridge, to Lackawanna Steel Construction Co., Buffalo.

100 Tons, Milbridge, Me., State bridge, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

SOUTH AND SOUTHWEST

200 Tons, Farley, N. M., State bridge over Ute Creek, to Des Moines Steel Co., Des Moines, Iowa.

110 Tons, Toccoa, Ga., bridge, to Nashville Bridge Co. Nashville, Tenn.

CENTRAL STATES

295 Tons, Ontagamie County, Wis., bridge, to Lakeside Bridge Co., Milwaukee.

200 Tons, Royalton, Ill., coal handling structure for Koppers Co., to Vierling Steel Works, Chicago.

185 Tons, Fremont, Neb., power house addition, to Fremont Foundry & Machine Co., Fremont, Neb.

115 Tons, Saint Ignace and MacKinaw City, Mich., two State transfer bridges, to Lackawanna Steel Construction Co., Buffalo.

CENTRAL STATES

420 Tons, Grand Coulee Dam, Wash., three closure gates, to Pacific Car & Foundry Co., Seattle, remainder of gates still pending.

135 Tons, Provo, Utah, hospital and nurses' home, to Provo Foundry & Machine Co., Provo.

130 Tons, Mare Island, Cal., three service buildings for Navy Department, to Judson-Pacific Co., San Francisco.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

1500 Tons, New York, contract No. 9, Queens-Midtown tunnel.

1000 Tons, Everett, Mass., repair shop and annex, Boston Elevated Railway.

700 Tons, New York, Temple of Religion tower at World's Fair.

600 Tons, Philadelphia, building, Hahnemann Medical College and Hospital.

400 Tons, New York, alterations to building on East 37th Street; John Lowry Co., New York, general contractor.

370 Tons, Marlboro, N. J., State hospital buildings.

270 Tons, Bloomfield, N. J., battery plant, Thomas A. Edison, Inc.

260 Tons, New London, Conn., auditorium, Connecticut College for Women.

250 Tons, New York, seaplane administration building, North Beach Airport, for Treasury Department.

250 Tons, Ashley, Pa., head frame and conveyor house, Glen Alden Coal Co.

250 Tons, Ebensburg, Pa., supports for grandstand, Treasury Department.

215 Tons, Worcester, Mass., building addition, Massachusetts Protective Association.

210 Tons, New York, Eastman Kodak Co. building at World's Fair.

185 Tons, Creedmoor, N. Y., addition to State building No. 45.

135 Tons, New York, Egyptian Government building at World's Fair.

THE SOUTH

1000 Tons, Oklahoma City, highway bridge; Ottinger Brothers, Hinton, Okla., low bidders.

800 Tons, Little Rock, Ark., auditorium; William Peterson Construction Co., Little Rock, low bidder.

425 Tons, Hampton, Va., State bridge.

130 Tons, Gunterville, Ala., Polecat Creek and Big Spring Creek bridges for TVA.

CENTRAL STATES

2700 Tons, Cleveland, East and West approaches of Main Street bridge; bids soon on part of East approach.

1200 Tons, Canton, Ohio, Timken Technical High School; plans ready about June 15.

900 Tons, Chicago, completion of Soldiers Field; Lundoff-Bicknell Co., general contractor.

(CONTINUED ON PAGE 98)

Steel Institute Hears Business Recovery Plans

(CONTINUED FROM PAGE 59)

of steel" more effectively in order to eradicate many false ideas in the public mind, Ernest T. Weir, vice-president of the institute and chairman of its publicity committee, discussed this subject in detail.

"We are all familiar," he said, "with the attacks that are constantly being made on the steel industry. Hardly a week goes by but that someone prominent enough to be quoted takes it to task for causing the current depression, prolonging the depression, or in some manner throwing a monkey wrench into the economic machinery of the country. These self-appointed critics speak from diverse standpoints, but in some respects they betray a striking uniformity. They are severely and unfavorably critical; they speak with an unrestraint possible only to those who are completely unhampered by knowledge of the facts, and, so far as I know, not one of them has ever had any practical experience in the steel business.

"As illustrations of the different types of persons who now offer us unsolicited advice, I give you on the one hand, Mr. Robert Jackson, Solicitor General of the United States, and on the other, Rev. Carl P. Hensler, of Pittsburgh, who in speaking before the recent National Catholic Social Action Conference in Milwaukee, said: 'The inflexibility of steel prices regardless of market conditions has contribuated much to the breaking down of our economy.'

"Such statements, of course, do not go unanswered. The institute has been doing a good job of following them up and refuting them with facts that give the accurate picture. Representatives of some individual companies likewise have been performing a service to the industry by presenting the story of steel in positive terms wherever an opportunity offers itself. These efforts, however, have been considerably less than adequate. In the first place, an attack is always more colorful news than a defense. The fellow who speaks first usually gets the headlines while the fellow who answers him is usually relegated to the 'Letters to the Editor' page. In the second place, spokesmen for the steel industry work under a handicap. A large segment of the public mind is predisposed against them, because for years most of what has been heard and read about steel has come from critics of the industry.

"We who are charged with responsibility for operating the many units of the steel industry today must share with our predecessors the blame for this condition. Attacks on the steel industry are not new. The industry is big and complex; it has little apparent direct contact with the public. Therefore, it always has been a chosen target for the radical, the social reformer, and the politician.

"In the past generation, what Americans have not heard or read that the steel industry operates as a feudal system with the owners and managers living as industrial barons and the workers as serfs; that the industry makes exorbitant profits but pays low wages to labor; that employment in the steel industry requires back-breaking toil under hazardous and unhealthful conditions; that the industry lags behind the times in the improvement of its methods and products; that it maintains a dominant position by charging artificially high prices for its products? These are but a few of the indictments that have been made over the years against our industry. They combine into a legacy of bad public opinion. From the standpoint of the industry's relations with the public, the important thing is not so much that they are false as that many people believe them to be true.

"Even in our day, industry fails to give the public a true impression of itself. With all the facts at hand to convince our people that industry is not only the friend and servant of the public but also an indispensable part of the public, we have neglected to use these facts with full effectiveness.

"If the people were given the opportunity to judge on the basis of the whole truth, there is no question which road they would take. As it is, politicians like Mr. Jackson are able to attack our industry at will. Considering the prestige of his office and the plausible-sounding story that can be constructed on a framework of half-truths and untruths, is it any wonder that he is given credence by persons who do not have the opportunity to know the facts? For purely political reasons, he attempted to shoulder blame for this administration-created depression on what he called the monopolies in industry. And he classified steel as a monopoly. Let us consider some of the most flagrant charges that are made against the steel industry by Jackson and other orators of his stripe and weigh them against the facts.

"They say it is a monopoly or a near-monopoly when in fact it is one of the most highly competitive industries in the country. That our industry is a big industry is undeniable, but bigness is not monopoly, and only ignorance or willful disregard of facts will confuse the two. The very existence of National Steel Corp. is proof of the competitive character of our industry. Its development from a small beginning to its present status in the industry would have been impossible except under competitive conditions.

"They accuse it of maintaining rigid and artificially high prices. I mention this only in passing because Mr. Girdler has thoroughly discussed the industry's price structure. However, high prices ought to result in big profits, which brings us to the next complaint—

"That the steel industry makes exorbitant profits. On the contrary, over the past ten years the industry's average return on investment has been only 3 per cent and it has never averaged as much as 5 per cent over any protracted period for which there are records. In 1937—the third best year in its history from a tonnage standpoint—its net profit was a fraction more than 6 per cent and the indicated loss for this year will again result in a probable 3 per cent net profit for the two-year period.

"Steel labor is exploited and receives a low wage, our critics charge. But steel labor receives one of the highest average annual wages in the country. From ore to finished products, an average of about 53 hours of labor is required directly and indirectly to produce a gross ton of steel. On the basis of the steel industry's average hourly wage of 81.8 cents in 1937, labor received $43.35 for producing this ton. Labor received 37 cents as its share of each gross sales dollar. The remaining 63 cents were divided as follows: Forty-four cents went for the purchase of raw materials and all other costs; two and one-half cents were added to surplus; one cent was paid in interest; five cents were set aside for depreciation; five cents were paid in dividends, and five and one-half cents were paid in taxes. All cost factors increased greatly in dollar volume. National Steel Corp.'s tax bill per ton, for example, was $3.94 for 1937 as against $2.49 for 1936.

"Steel employment is described as back-breaking and extremely hazardous. Yet machines have eliminated

practically all heavy labor in the industry, as is evidenced by the fact that less than 7 per cent of all jobs can be classified as unskilled. Accurate records maintained over a long period of time prove that steel is one of the safest of all industries, and that the steel worker is safer on his job than the motorist in his car and even safer than the average man in his own home.

"Critics have placed steel at the tag end of the industrial parade in developing new products and improving its methods. The steel industry is doing its part in this respect to contribute to the total of all industry which today actually has 15,000 new products developed and ready to be put on the market the moment conditions warrant it. This will require new investment of $800,000,000 to $1,000,000,000 which is just the kind of prosperity-making buying power the critics are demanding—and preventing. From 1931 to 1937 inclusive, while the steel industry was earning a net of $190,000,000—seven-tenths of one per cent on investment—it was spending not less than $700,000,000 on modernization. Much of this money was spent on equipment to make new types of steel that stimulated modernization in the plants of steel customers.

"The next complaint, which is so frequently made by our critics, is amusing in the light of the foregoing statement. Namely, that technological development in the steel industry displaces thousands of men, forcing them into the ranks of the unemployed. The fact is that in 1937—its third best year—the industry had an average of 572,000 employees, or 25 per cent more than in 1929, its peak year in production.

"The basing point method of quoting prices is frequently attacked. Time does not permit an adequate discussion of this pricing method. It is notable, however, that its most severe critics begin to quibble and qualify when they get down to cases in attempting to substantiate their theory that it should be abolished. It is equally notable that this method has existed for 40 years in a highly competitive industry with only rare complaints from the 42,000 steel buyers of the country, and that there is no evidence that the basing point pricing method adds a dime to the total cost of steel to the public.

"These are among the false accusations against the steel industry that most frequently tumble from the lips of critics. How ridiculous they appear when lined up beside the facts! Yet many persons accept them; base their opinion of the steel industry on them because they do not know and have no way of knowing the facts. We must make it easy for the people of the country to know the story of steel. It will attract and hold their interest because it has a direct and vital bearing on their own individual well-being. The real story of steel is not one of drab industrial statistics or stock market figures. It is one of sustained contribution to human values; a story of the part the steel industry has played in giving the American people the American living standard."

W. A. Irvin Sees Great Future for Light-Weight Steels

IN the four-year period from 1935 through 1938 the steel industry will have spent $840,000,000 for new equipment and construction, William A. Irvin, vice-chairman of the United States Steel Corp. and vice-president of the institute, said in a paper dealing with changing trends in the steel industry.

He traced the various changes that have occurred in the production and consumption of different types of steel products, stressing the rise in light-weight materials and the relative decrease in the heavier products. He cited that rails accounted for only 4 per cent of the total steel production in the period 1934 through 1937, while in the five years, 1899-1903, they made up 23 per cent of total output. Tin plate amounted to 8 per cent in the years 1934-1937, compared with only 3 per cent in 1899-1903.

This remarkable shift of emphasis in the steel industry, he said, was aided and abetted by the development of the continuous method of hot rolling and cold reducing flat wide products.

Citing the fact that the automobile industry has become the largest user of light-weight steels, Mr. Irvin said that motor cars use or have available about 125 types of steel.

Sheets for the latest type of automobile fenders last year cost the manufacturer 46 per cent less than in 1923 and 29 per cent less than in 1929, he said. He estimated that the average life of a gear tooth has been lengthened more than 500 per cent since 1923 through better steel manufacture.

Mr. Irvin predicted that the future adaptations of higher quality, lighter weight steels "will far exceed anything yet experienced or suggested."

For the first time, the institute held a separate session devoted exclusively to commercial subjects, at which Walter E. Watson, vice-president of the Youngstown Sheet & Tube Co. presided. R. E. Zimmerman, vice-president of the United States Steel Corp., whose paper on "Coupling Sales to Research," is published in this and last week's issues of THE IRON AGE, was the first speaker.

William B. Gillies, vice-president, Youngstown Sheet & Tube Co., in a paper, "Promoting Demand Through Improving Quality," said:

"When we are called upon to discuss what the steel industry has done, or when we are criticized for what it may not have done, we should recognize that it is not sufficient to present only a record of comparative selling prices of its output. We must go further and explain how economies which better steel quality has brought to fabricators and users of steel must be taken into consideration. This point can be established most impressively by citing specific examples like those of the automobile hood and the steam turbine.

"Each of us has available a great fund of such graphic examples, but all too often they remain hidden in the recesses of our files or of our memories. We owe it to the industry to bring them to public attention at every possible opportunity.

"The average man and woman should be acquainted with what steel has done for them in promoting the general standard of living. Much has been done by the institute in telling the public of the industry's achievements. Further good can be accomplished by those directly or indirectly interested in advancing the cause of the industry."

Mr. Gillies pointed out that steel products over the years have improved in quality and variety and that many new and economically important types of steel have sprung into being, also that the results have been lower costs and short cuts in methods for customers and more and more value for the ultimate consumers.

Return on Investment Low

"If it could be said that the industry had made all these marvelous strides and had passed on to its consumers enough of the cost to pay handsome returns upon the investment, forcing the customers to pay for the development, then the improvements might be viewed as a job well done but well paid for. But it is a well known fact to you that the return upon the invest-

ment in steel manufacture is notoriously low," Mr. Gillies said.

"We assume it is equally well known in the industry that all these improvements have been passed on to steel's customers at actual decreases in the prices of many products, and at only a very small increase in the average selling price of all products."

The Small Order Problem

The institute's members also heard a paper by Norris J. Clarke, vice-president, Republic Steel Corp., on "The Problem of the Small Order."

Mr. Clarke pointed out that with hundreds of different compositions of pig iron and thousands of compositions and types of steel, it is impossible for any steel producer even to begin to carry an inventory large enough to permit shipments to any considerable number of customers without producing the iron or steel against the particular specification.

Theoretically, said the Republic executive, quantity extras are supposed to compensate the steel manufacturer for the extra cost and trouble entailed in producing small orders. However, definite experience shows that the extras, regardless of size, do not accomplish these desirable objectives.

"Whether the customer purchases his steel direct from the steel company or from the warehouse, the sum of the steel purchased is the same. If he buys in small lots from the warehouse, the producer will eventually get the total anyway, so that it is good business, as far as practicable, to encourage placing small lot business with the warehouses up to the point where the customer's orders become desirable mill production items.

Customers' demands and requirements, further complicated by development of the continuous mills, are particularly difficult to meet in times like these, Mr. Clarke said. Other complications are shipping, clerical and other costs, he explained. Then he proposed for consideration solutions to the small order problem. He said:

"I think that a large part of the trouble is traceable directly to our own sales departments. Our salesmen in the field are anxious to secure orders and to make a showing. Frequently they know perfectly well that the order which the customer is giving is not profitable and will possibly result in a headache for all concerned. The salesmen, however, justify the orders on the best basis they can.

"It is my feeling that we should all see that our sales representatives in the field have a more thorough understanding of the question of operating costs than some of them appear to have today. I believe it might be worth while to let the operating department now and then issue to the sales force a bulletin which would deal in some detail with the small order problem, analyzing perhaps some orders which have actually been received and shipped.

Warehouse the Solution

"I am convinced that the warehouse is to a considerable extent the solution of the small order problem. I say this, realizing that the steel distributer cannot be expected to carry sufficient kinds of steel in stock to meet all of the requirements of the steel buyer. Nevertheless the distributer has his definite place in the economic picture of the industry, and he serves as a convenient, necessary and economical medium between the producer and the consumer requiring small quantities of steel. As one means of curtailing the number of costly and unprofitable small orders we should encourage the small user whenever possible to place with the warehouse the orders which the mill cannot easily handle.

"Increasing tendency of large mills to accept small orders cannot help but work a hardship on the warehouse, even as it works a hardship on the producer," Mr. Clarke pointed out. "I have," he said, "a real and great sympathy for the steel distributer and the problems which confront him. There are very definite limitations in stocking inventories beyond which he cannot go.

Technical Session Well Attended

The attendance and interest in the technical sessions, Thursday afternoon, probably have not been equalled for some years. All the papers were directed either directly or obliquely toward blast furnace operation, rather than directed toward the rolling, fabrication or metallurgy of finished steels.

In his carefully developed paper, entitled "Microscopic and Petrographic Studies of Blast Furnace Materials," J. T. Whiting, vice-president of Alan Wood Steel Co., described the aims of and results obtained by microscopic and petrographic studies of blast furnace materials in their various stages of change from the raw ore to finished pig iron. Mr. Whiting's discourse dealt with the use of magnetite sinter carrying silica rather than hematite ore, and one interesting point brought out was that the slower reduction of the former is due in large part to what he terms the "enameling Effect"—that is, the sealing of the surface of the particles by a skin of slag, largely iron silicate, formed within the furnace.

In his discussion of Mr. Whiting's paper, J. E. Lose, of the Carnegie-Illinois Steel Corp., subscribed to many of the conclusions, but criticized in particular the author's statement that the heat of formation of the several silicates determines which of them will form. Mr. Lose stated this view is valid for a strictly homogeneous one-phase system, but not necessarily for a heterogeneous picture such as Mr. Whiting has under consideration.

Another really momentous report was the paper "Peripheral Distribution of Gases in the Blast Furnace," by H. W. Johnson, of Inland Steel Co. Mr. Johnson demonstrated that measure and comparison of inwall temperatures at four equidistant points on the inner edge of the furnace lining, about 10 ft. below the normal stock line, will, by reflecting irregularities in peripheral gas distribution, provide a rough measure of the efficiency at which the furnace is working. There will likewise be some advance notice of changes or impending changes at one or more points within the furnace in conditions that ultimately determine the smoothness and regularity of furnace operation, and consequently, the fuel consumption, flue dust losses and the quality of metal and slag.

William A. Haven, vice-president of Arthur G. McKee & Co., in his review and discussion of Mr. Johnson's paper, pointed out that this type of investigation was extremely important for operating the planned furnaces of the super-1000 ton type. Mr. Haven went on to describe work he has done to determine the effects of bell size and design and sequence of charging upon distribution of stock under the large bell, used on the larger furnaces.

The next paper dealt with the "Effects of Variation of Pig Iron on Quality of Steel," and was presented by H. W. Graham and H. K. Work, of the Jones & Laughlin Steel Corp. This paper is reprinted in this issue and last week's issue of THE IRON AGE.

The final paper of the technical session dealt with "A Study of Blast Furnace Slags," and was presented by Richard S. McCaffery, of the University of Wisconsin. This paper was concerned mostly with a detailed review of the furnace practice at Corby, England, in which a practice was developed by which the furnaces were burdened and slagged with complete indifference to the sulphur content of the ores or the pig iron. Desulphurization is carried on in the ladle, which is provided with a cover.

. . . .SUMMARY OF THE WEEK. . . .

. . . Ingot production at lowest rate since October, 1934.

° ° °

. . . Reinforcing bar prices lower in section of Middle West.

° ° °

. . . Steel scrap drops at Pittsburgh and Cleveland.

STEEL ingot production, estimated this week at 25 per cent of the industry's capacity, down three points from last week, is the lowest since October, 1934. Although the steel industry operated on a lower basis during the greater part of the depression year 1932, it was under this week's rate in only four months of 1933 and two months of 1934.

To some extent this week's low rate was caused by the fact that a number of mills remained idle on Memorial Day, although it is not a regular mill holiday. However, the reduction goes deeper than that, the report being general that incoming orders during the last half of May were definitely below those of the first half. As a whole, May orders and shipments did not equal those of April. In the Pittsburgh district the decline in business ranged from 10 to 20 per cent below April.

Pittsburgh has been hardest hit this week in operations, having dropped four points to 18 per cent. While the Chicago area fell five and a half points to 23 per cent, it is still well above Pittsburgh. The Youngstown district is five points lower at 19 per cent; the Wheeling-Weirton area is down to 47 per cent from 54, and eastern Pennsylvania is at 21 per cent. The only important gain was in the Cleveland-Lorain district, where operations rose from 16 to 24 per cent. A slight recovery may occur next week, but the average for June is expected to be below that of May.

TO what extent hesitation among buyers because of the price situation may have influenced the downward trend of business in the past two weeks is difficult to determine. Developments at last week's meeting of the American Iron and Steel Institute, especially the wholly unexpected advice from General Hugh S. Johnson that the steel industry reduce its prices, were bound to have an unsettling influence on buyers.

Meanwhile, some open price weakness has developed in the Middle West. Two mills in the St. Louis area have reduced prices of new billet and rail steel reinforcing bars $5 a ton, the reduction applying both to resale prices and quotations to distributers. This is an attempt to stabilize the situation as some resale quotations have been more than $10 a ton below published resale prices. Weakness in resale prices of merchant wire products has also developed in some middle western states, though mill prices have not been reduced.

Reaffirmation of prices for third quarter has extended to bolts, nuts and rivets. Base prices for commodity cold rolled strip steel have been established in line with those prevailing on cold rolled sheets, or $2 a ton below the quotations formerly prevailing. The new price is 3.25c. a lb., Pittsburgh or Cleveland. An announcement of galvanized sheet prices is expected this week.

Steel scrap prices continue to show weakness. While unchanged at Chicago and Philadelphia, they are 25c. lower at Pittsburgh and 50c. lower at Cleveland. Some other grades at Cleveland have declined as much as $2 a ton. Expected purchasing by Italy of 100,000 tons or more, following a meeting last week of the European Scrap Cartel, has thus far failed to materialize, and the market is receiving little or no support either from domestic or export sales.

PROSPECTS for steel buying by the important consuming channels during the next two months at least are not encouraging. Construction work, though much below normal, is relatively one of the best sustaining influences in steel demand, with shipbuilding showing some promise of tonnage over the next few months. Railroads are so inactive as to be scarcely a factor in the market, while the automobile industry, needing little or no steel for completion of its runs on 1938 models, is still some distance away from the necessity of ordering steel for 1939 models.

Structural steel lettings in the week were only 6500 tons, the largest being 1650 tons for an approach to the George Washington Bridge, New York. New work out for bids totals 18,000 tons, mostly public work.

The International Tin Plate Cartel has been renewed for three years, with slightly larger quotas accorded American mills.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	June 1, 1938	May 24, 1938	May 3, 1938	June 2, 1937
Rails, heavy, at mill	$42.50	$42.50	$42.50	$42.50
Light rails, Pittsburgh	43.00	43.00	43.00	43.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	37.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	37.00
Slabs, Pittsburgh	37.00	37.00	37.00	37.00
Forging billets, Pittsburgh	43.00	43.00	43.00	43.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	47.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	2.10

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	2.45
Bars, Chicago	2.50	2.50	2.50	2.50
Bars, Cleveland	2.50	2.50	2.50	2.50
Bars, New York	2.81	2.81	2.81	2.78
Plates, Pittsburgh	2.25	2.25	2.25	2.25
Plates, Chicago	2.30	2.30	2.30	2.30
Plates, New York	2.55	2.55	2.55	2.53
Structural shapes, P'gh	2.25	2.25	2.25	2.25
Structural shapes, Chicago	2.30	2.30	2.30	2.30
Structural shapes, New York	2.52	2.52	2.52	2.5025
Cold-finished bars, P'gh	2.90	2.90	2.90	2.90
Hot-rolled strip, P'gh	2.30	2.30	2.40	2.40
Cold-rolled strip, P'gh	3.10	3.10	3.20	3.20
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.80
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.90
Hot-rolled sheets, P'gh	2.30	2.30	...	..
Hot-rolled sheets, Gary	2.40	2.40	...	..
Cold-rolled sheets, P'gh	3.35	3.35	...	...
Cold-rolled sheets, Gary	3.45	3.45	...	...
Wire nails, Pittsburgh	2.75	2.75	2.75	2.75
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.80
Plain wire, Pittsburgh	2.90	2.90	2.90	2.90
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.95
Barbed wire, galv., P'gh	3.40	3.40	3.40	3.40
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	3.45
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.35

Pig Iron

Per Gross Ton:	June 1, 1938	May 24, 1938	May 3, 1938	June 2, 1937
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.76
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	23.89	23.89	23.89	23.69
No. 2, Birmingham†	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago*	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.26
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago*	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	30.34	30.34	30.34	30.04
Ferromanganese, seab'd carlots	102.50	102.50	102.50	102.50

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$10.75	$11.00	$11.75	$18.75
Heavy melting steel, Phila.	12.00	12.00	12.25	17.75
Heavy melting steel, Ch'go	10.75	10.75	11.25	16.75
Carwheels, Chicago	12.50	12.50	13.00	19.25
Carwheels, Philadelphia	14.75	14.75	14.75	19.75
No. 1 cast, Pittsburgh	13.25	13.25	14.25	19.25
No. 1 cast, Philadelphia	14.25	14.25	15.25	20.25
No. 1 cast, Ch'go (net ton)	10.75	10.75	10.75	15.25
No. 1 RR. wrot., Phila.	15.25	15.25	15.25	19.75
No. 1 RR. wrot., Ch'go (net)	8.25	8.25	8.75	15.25

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$4.60
Foundry coke, prompt	5.00	5.00	5.00	5.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	9.00	9.00	10.00	14.00
Lake copper, New York	9.125	9.125	10.125	14.12½
Tin (Straits), New York	37.50	37.25	34.80	56.25
Zinc, East St. Louis	4.00	4.00	4.15	6.75
Zinc, New York	4.39	4.39	4.54	7.10
Lead, St. Louis	3.85	4.10	4.35	5.85
Lead, New York	4.00	4.25	4.50	6.00
Antimony (Asiatic), N. Y.	13.75	14.25	15.25	15.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
June 1, 1938	2.487c. a Lb.	$23.25 a Gross Ton	$11.17 a Gross Ton
One week ago	2.487c.	23.25	11.25
One month ago	2.512c.	23.25	11.75
One year ago	2.512c.	23.25	11.75

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1938					$14.00, Jan. 4	$11.17, June 1
1937	2.512c., Mar. 9	2.249c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 16
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 23
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.811c., Apr. 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.877c., Jan. 12	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 17	13.08, Nov. 22

NOTE: Revised finished steel composite prices for the period 1928 to date are published elsewhere in this issue.

. . . PITTSBURGH . . .

. . . District operations drop to 18% . . . Wheeling-Weirton off seven points to 47% . . . Sales off 10 to 20% in May . . . Scrap again declines.

PITTSBURGH, June 1. — Operations in the Pittsburgh district have dropped four points to 18 per cent of capacity and the Wheeling-Weirton district is off seven points to 47 per cent. A decline in new business and the utilization of accumulated raw steel supplies by some mills are responsible for the rather sharp decline in operations over the past few weeks.

Sales of steel products in this district during May were about 10 to 20 per cent below April bookings. Orders in the past week have receded in volume, with part of the poor showing attributed to the week-end holiday.

A new fundamental base has been established on commodity cold rolled strip at 3.25c. f.o.b. Pittsburgh and Cleveland. Certain extra changes are similar to those made in the cold rolled sheet card. A new galvanized sheet set-up is expected some time this week.

In the midst of a seasonal decline in steel demand, the possibility of increased structural steel specifications during the summer months stands out.

No. 1 heavy melting steel is off 25c. this week, being quoted at $10.50 to $11 a ton.

Pig Iron

In some cases May shipments were slightly ahead of those in April but new business in the past few weeks reflects no improvement from previous odd-lot day-to-day buying. Present prices have been reaffirmed for third quarter delivery.

Semi-Finished Steel

Weekly tonnages continue to fluctuate with the average volume showing little or no improvement and, if anything, a downward trend. Non-integrated makers are buying sparingly because of the uncertain outlook in finished steel business.

Bars, Plates and Shapes

Total bar bookings were off some in the past week and reflect a slowing up in specifications in practically all lines of consumption. Structural inquiries have improved recently but a considerable lapse between these and firm contracts is evidenced by the small amount of work actually being placed. There is a possibility that some of the pending work will be placed during the next few months when demand for other steel products is lagging.

Cold Finished Bars

May business was in less volume than that of April. Orders in the past week showed no improvement from the previous period. Producers expect little or no automotive business for some time.

Reinforcing Bars

New projects are few and far between and current awards do not involve large tonnages. Prices are soft in some sections of the country and published quotations in many cases are not being realized.

Tin Plate

Operations are unchanged at 45 to 50 per cent. New business shows little or no improvement. The slight increase in quota granted American tin plate manufacturers by the European cartel is not expected to have much effect on tin plate production.

Wire Products

Sales of wire products in May were not much below those of April owing chiefly to a slight pickup in manufacturing wire orders which offset the moderate decline in merchant wire products. The quantity discount set up on merchant wire products continues to be loosely handled in various spots throughout the country.

Tubular Goods

The trend in tubular goods sales has changed little one way or the other in the past several weeks. Oil-country goods orders, while still somewhat below expectations, are relatively larger than demand for other steel products.

Sheets and Strip

Sheet demand has leveled off further and mills are forced to run intermittently. Orders are exceptionally small, although fairly good diversification exists. In line with recent changes in cold rolled sheets, commodity cold rolled strip base has been revised to $3.25, Cleveland or Pittsburgh. On 12-in. and wider, extras are practically identical to those in effect for cold rolled sheets.

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	June 1, 1938	May 24, 1938	May 3, 1938	June 2, 1937	1938	1937
Fabricated structural steel awards	6,525	12,200	21,230	30,900	278,705	529,915
Fabricated plate awards	3,010	635	500	14,430	57,295	72,185
Steel sheet piling awards	900	3,700	0	0	15,025	16,870
Reinforcing bar awards	2,050	5,325	2,160	6,130	92,690	91,935
Total Lettings of Construction Steel	12,485	21,860	23,890	51,460	443,715	710,905

. . . . CHICAGO . . . .

. . . Ingot production drops five and half points to 23% . . . Two Western mills quoting $5 a ton lower on reinforcing bars in St. Louis area . . . Steel scrap unchanged.

CHICAGO, June 1.—Memorial Day was observed by only two producers here but this action and the fact that operations were resumed at rates considerably lower than last week caused a five and a half point reduction in the district's schedule to 23 per cent of capacity. More furnaces are to be added later in the week by one large mill but the exact number has not yet been determined.

The price situation dominates the current steel scene. Sellers of flat rolled products affected by recent changes in bases and extras report no increase in business because of reductions on some items and state that even a further more general lowering of prices probably would not stimulate orders to an important degree. It is emphasized here that whether the changes of last week constitute an increase or decrease from previous price levels is determinable only in individual cases, since every order naturally will be different because of the varying extras.

Two mills in the vicinity of St. Louis have recently been taking orders for billet and rail steel reinforcing bars at a maximum of $5 a ton under the published prices, or 2.25c., Chicago, for billet steel, 2.10c., Chicago, for rail steel. These mills are said to be refusing to go lower than the above prices in an effort to stabilize this market, which at times suffers from reductions of $10 to $14 a ton.

The new third quarter price on galvanized sheets is still not available but local mills believe a price of 3.65c., Pittsburgh, which has been reported as likely, is a reasonable guess.

Sales and specifications during the past week at Chicago district mills and sales offices are unimproved. The general situation is unchanged, with buying from the railroad and motor car manufacturers apparently no nearer than several months ago. Sales of wire products in the rural areas and pipe to jobbers are fairly good but other outstanding performers are rare. Little increase is expected from the builders of farm equipment until later in the summer.

Scrap prices are unchanged, with No. 1 steel remaining at $10.50 to $11.

Pig Iron

May shipments of iron and foundry coke were about even with those of April but the June trend may be slightly lower. Farm equipment foundries are slowing their operations gradually and some of the plants are expected to close down for inventory purposes later this month, at which time vacations will be taken. Spot sales are sporadic, indicating that purchases are for filling stock and immediate needs only.

Wire and Wire Products

With the announcement of fall terms this month and the fact that inventories in the hands of dealers throughout the agricultural areas are not particularly heavy, wire sellers are anticipating a fairly good business in merchant products over the early summer. Crop forecasts are optimistic and, although farm income will be under last year, cash still should be plentiful in the rural regions. Industrial sales continue low.

Plates

With railroad purchasing for new equipment and repairs at a virtual standstill, this market shows no signs of increasing activity. Structural fabrication is taking some plates. Demand is strong from jobbers for pipe, one mill reporting this line as its most active at present.

Bars

Deliveries are still available in one to two weeks, as specifications have not increased from the motor car industry or railroads, and seem to be lessening from the agricultural implement makers and miscellaneous sources. A fair demand is still in evidence from jobbers.

Structural Shapes and Reinforcing Bars

Construction projects of size are few and far between. Many small bridges requiring from 20 to 50 tons of bars are being bid on at State lettings and these, in some measure, compensate for the lack of larger jobs. Reinforcing prices still are very weak.

Sheets and Strip

About two weeks have elapsed since new base prices and revised extras were announced for these flat rolled products but as yet no appreciable effect of sales has been perceived and none is expected. A general statement as to whether the changes will constitute an increase or decrease from the old prices is difficult to make, as every order must be individually figured before its comparative status may be determined. Some customers will obtain reductions from the old cost, whereas others will pay more.

....BUFFALO....

. . . Republic Steel to bank blast furnace.

BUFFALO, May 31.—Bethlehem's Lackawanna plant is operating seven open hearths after having reduced to four during the holiday weekend. Republic Steel Corp. and Wickwire-Spencer Steel Corp. are operating one each.

Republic Steel Corp., which has been operating one blast furnace for some months, has decided to curtail further and this stack will be banked this week.

A Buffalo concern will fabricate the 340 tons of structural steel required for the erection of a school at Cuba, N. Y., and another local fabricator has the contract for 125 tons for a State bridge in Chenango County.

RAILROAD BUYING

Missouri & North Arkansas has placed an order for two passenger-baggage motor cars with **American Car & Foundry Co.**

American Smelting & Refining Co. is taking bids on 30 box cars.

Boston & Maine has placed an order for one gasoline locomotive with **Plymouth Locomotive Works.**

Cornwall Railroad Co. is considering the purchase of seven 70-ton hopper cars.

U. S. Army Department is taking bids on a gasoline drive or a diesel drive locomotive.

American Car & Foundry Motors Co. has received an order from **Brooklyn Bus Corp.**, New York, for 75 35-passenger motor coaches.

J. G. Brill Co. has received an order for 28 40-passenger trolley coaches for **Des Moines Railway Co., Des Moines, Iowa.**

THE IRON AGE Finished Steel Composite Prices on Revised Basis for 10 Years

OWING to the basic change in the method of quoting prices on flat rolled steel products, it has been necessary, as stated last week, to revise THE IRON AGE finished steel composite price, which now stands at 2.512c. a lb. A record of comparable composite prices from the beginning of 1928 to date is printed below, the price of No. 10 gage hot rolled sheets having been substituted for No. 24 gage hot rolled annealed sheets (black sheets), the former gage and type coming the closest to the present new fundamental base price for all hot rolled sheets. The dates used are the dates of going to press, not dates of issue.

Finished Steel Composite Price
Cents Per Lb.

1938
Jan. 4 through May 17—2.512.
May 24—2.487.

1937
Jan. 4 through March 2—2.249.
March 9 through Dec. 28—2.512.

1936
Jan. 7 through 28—2.062.
Feb. 4 through March 3—2.040.
March 10 through 31—2.016.
April 7 through June 23—2.028.
June 30—2.053.
July 7 through Sept. 22—2.091.
Sept. 29 through Nov. 24—2.116.
Dec. 1—2.168.
Dec. 8 through 21—2.193.
Dec. 28—2.249.

1935
Jan. 8 through Sept. 24—2.056.
Oct. 1 through Dec. 31—2.062.

1934
Jan. 2 through April 17—1.945.
April 24 through July 3—2.118.
July 10 through Dec. 31—2.056.

1933
Jan. 3—1.898.
Jan. 10—1.886.
Jan. 17 through Feb. 28—1.873
March 7 through 28—1.867.
April 4 through 11—1.823.
April 18 through 25—1.811.
May 2 through 16—1.792.
May 23 through June 20—1.817.
June 27—1.829.
July 5 through Aug. 1—1.878.
Aug. 8 through Sept. 19—1.884.
Sept. 26—1.909.
Oct. 3 through 24—1.953.
Oct. 31—1.940.
Nov. 8 through 28—1.933.
Dec. 5 through 26—1.945.

1932
Jan. 5—1.883.
Jan. 12 through Feb. 23—1.887.
March 1 through 8—1.873.
March 15 through 22—1.870.
March 29 through June 28—1.908.
July 5 through Aug. 30—1.914.
Sept. 6 through Oct. 18—1.915.
Oct. 25 through Dec. 27—1.898.

1931
Jan. 6—1.962.
Jan. 13 through March 31—1.981.
April 7 through May 26—1.974.
June 2 through July 14—1.964.
July 21 through Oct. 20—1.945.
Oct. 27 through Nov. 24—1.939.
Dec. 1—1.927.
Dec. 8 through 15—1.920.
Dec. 22—1.902.
Dec. 29—1.883.

1930
Jan. 7—2.192.
Jan. 14 through 21—2.154.
Jan. 28 through March 18—2.148.
March 25—2.142.
April 1 through 15—2.106.
April 22—2.093.
April 29—2.074.
May 6 through 13—2.062.
May 20 through June 17—2.049.
June 24 through Aug. 5—2.018.
Aug. 12 through 19—1.993.
Aug. 26 through Sept. 23—1.987.
Sept. 30—1.993.
Oct. 7 through Nov. 11—1.981.
Nov. 18 through Dec. 2—1.974.
Dec. 9 through Dec. 30—1.962.

1929
Jan. 8 through March 26—2.192.
April 2 through May 21—2.223.
May 28 through July 9—2.236.
July 16 through Aug. 6—2.223.
Aug. 13 through Sept. 17—2.211.
Sept. 24 through Oct. 22—2.198.
Oct. 29 through Nov. 26—2.192.
Dec. 3 through Dec. 31—2.204.

1928
Jan. 3 through Jan. 24—2.131.
Jan. 31 through Feb. 7—2.156.
Feb. 14—2.169.
Feb. 20 through April 3—2.178.
April 10 through 17—2.186.
April 24—2.173.
May 1 through 15—2.161.
May 22 through July 2—2.154.
July 10 through 31—2.142.
Aug. 7 through Oct. 16—2.161.
Oct. 23—2.179.
Oct. 30 through Nov. 20—2.186.
Nov. 27 through Dec. 4—2.167.
Dec. 11 through 31—2.192.

....PIPE LINES....

Texas Co., Houston, Tex., plans 12-in. welded steel pipe line from Houma, La., oil field to Port Arthur, Tex., about 250 miles, for crude oil transmission to refinery at last noted place. Line will have a rated capacity of about 75,000 bbl. per day, with booster pumping stations along route. Cost over $2,000,000. Project will include a steel pipe line gathering system in Terrebonne Bay and neighboring oil field areas in southeastern Louisiana, connecting with main line from Houma field.

General Purchasing Officer, Panama Canal, Washington, closes bids June 10 for 4000 lin. ft. of galvanized welded steel pipe, and 2000 ft. of 2-in. welded steel pipe; also for 1000 ft. of 4-in. cast iron soil pipe (Schedule 3357).

City Commission, Dayton, Ohio, has approved plans for new high-pressure pipe line for main water supply. Cost about $300,000, of which $200,000 will be represented by bond issue and $100,000 through Federal aid.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., plans extensions in pipe lines for gas transmission and distribution in district No. 842, recently established.

Rochester Gas & Electric Corp., Rochester, N. Y., plans extensions and replacements in gas pipe lines in different parts of city. Appropriation has been authorized.

Fisher County Pipe Line Co., Rotan, Tex., recently organized by C. W. Edwards, Rotan, and associates, plans new 2-in. welded steel pipe line from local oil field to Hawley Station, Jones County, about 12 miles, for crude oil transmission to new bulk storage plant at latter place. Connection will be made with trunk line of Humble Oil & Refining Co., at Hawley Station. New line will have a rated daily capacity of 1400-bbl. per day and will include booster pumping station. It is proposed to double output of line at later date.

Columbian Petroleum Co., 135 East Forty-second Street, New York, operating South American Gulf Oil Corp., a Venezuelan subsidiary, has let contract to Lindgren & Swinnerton, Inc., 225 Bush Street, San Francisco, for new 12-in. welded steel pipe line from Barco oil field, western Venezuela, where company has a concession, to terminal plant to be located on Colombian seaboard, about 287 miles, for crude oil transmission to latter point, where tankers will be loaded for northern destinations. Award for electric welding has been made to Brown Brothers Welding Co., 223 Main Street, San Francisco. Tractors of special construction, made by Lewis Brothers, Tulsa, Okla., will be used in construction of line, which has right of way over both mountains and through marshy lands. Booster pumping stations and other operating facilities will be installed. Company recently disposed of a note issue of $15,000,000, a considerable part of fund to be used for project, which is scheduled to begin this month. First noted companies are joint interests of Texas Co., and Socony-Vacuum Oil Co., Inc., both New York.

CANADA

. . . Dominion plants being aided by British armament orders.

TORONTO, May 31.—Ordnance and airplane contracts are expected to have a generally stimulating effect on steel sales in this country and also will result in heavy purchases of machine tools. The mining industry is showing indications of general betterment and during the past week or two several companies have announced mill plans or are contemplating same. Agricultural implements are showing better turnover and production continues at a good rate. Building trades also are steadily stepping up with consequent increased demand for reinforcing bars and structural shapes. Sheet sales are steady with deliveries running three to four weeks.

Canadian steel interests are preparing new price schedules for sheets which will show minor upward revisions. Otherwise prices are unchanged.

. . . CLEVELAND . . .

. . . Ingot rates continue to fluctuate . . . Sales lower in May than in April . . . Commodity cold rolled strip reduced $2 a ton . . . Wire products weak in some areas.

CLEVELAND, June 1.—Ingot output continues to fluctuate as is to be expected under present business conditions. This week the average for the Cleveland-Lorain district is up eight points to 24 per cent, due to better schedules at two plants and the resumption of open hearths at a third plant after idleness. The rate for Youngstown and nearby cities is down five points to 19 per cent.

Aggregate new business for producers during May was slightly below the April total, and it is discouraging to report that demand shows no sign of becoming stronger in the immediate future. Fabricators are content to ride along with inventories low.

Following the new setup on cold rolled sheets, new base prices and new extras have been placed in effect for commodity cold rolled strip, which is now 3.25c., Pittsburgh and Cleveland, and 3.65c., Worcester. Prices in the secondary market for merchant wire products are very ragged in certain Midwestern areas. New billet reinforcing bar prices are weaker than usual in some Middle West states.

No. 1 heavy melting scrap is nominally 50c. lower at Cleveland.

Activity in pig iron and iron ore continues restricted.

Pig Iron

Undelivered tonnage has been decreasing due to slow depletion of consumer inventories, producers here report. Numerically new orders have been gaining in recent weeks, but the purchases are individually small in comparison to normal requirements. Shipments for May were close to the April volume. Prices on all grades of iron have been reaffirmed for third quarter.

Sheets and Strip

Commodity cold rolled strip is 3.25c., Cleveland or Pittsburgh, and 3.65c., Worcester, under the new setup which covers widths from 2 in. to 12 in. and which brings the product into alinement with the new cold rolled sheet levels. Application of the new extras to the new base prices shows an overall average reduction of roughly $2 per ton, although certain sizes are down as much as $4 per ton and others are higher than previously. Item quantity deductions are the same as cold rolled sheets. Base is 25 to three net tons. In addition to the item quantity extra, l.c.l. lots which total under 7000 lb. are subject to an order quantity extra of 25c. per 100 lb. Lamp stock is 10c. extra.

Bars, Plates and Shapes

Around 1200 tons of structural steel and 250 tons of reinforcing bars will be required for the new Timken Technical High School in Canton, Ohio, plans for which are expected to be ready in two or three weeks. Bids will be called for soon for part of the east approach for the Main Street bridge, Cleveland. Approximately 2700 tons of structural steel and 1400 tons of reinforcing bars will be required for both approaches, while the steel sidewalk and bridge floor will involve about 750 tons.

Bolts, Nuts and Rivets

Third quarter contracts for these products will be renewed on the basis of current quotations. Activity remains light.

Wire and Wire Products

Aggregate incoming business for producers remains light, headed by demand for merchant wire products. While requirements of most agricultural sections are tapering, the movement as expected remains fair in a few districts. Prices in the secondary market are shaky in certain Mid-Western areas.

REINFORCING STEEL

. . . Awards of 2050 tons; 3920 tons in new projects.

AWARDS

317 Tons, San Mateo, Cal., junior college science building, to Bethlehem Steel Co., San Francisco.

284 Tons, San Francisco, Fort Funston construction, to Soule Steel Co., San Francisco.

250 Tons, Pittsburgh, Highland Park bridge, to Jones & Laughlin Steel Corp., Pittsburgh.

175 Tons, Arkport, N. Y., dam No. 8, to Bethlehem Steel Co., Bethlehem, Pa.

162 Tons, Odair, Wash., Grand Coulee project (Invitation 38051), to Bethlehem Steel Co., Seattle.

125 Tons, Springfield, Mass., waterworks, to Albany Steel & Iron Co., Albany, N. Y.

125 Tons, Patrick County, Va., bridge, Blue Ridge Parkway, to Virginia Steel Co., Richmond, Va.

103 Tons, New York, Fulton Fish Market, to Igoe Bros., Newark, N. J.

100 Tons, Philadelphia, Navy requisition 5036-38, to W. Ames & Co., Jersey City, N. J.

100 Tons, Washington, Catholic University faculty building, to Rosslyn Steel & Cement Co., Washington.

100 Tons, Bucyrus, Ohio, sewage disposal plant, to Pollak Steel Co., Cincinnati.

100 Tons, Bennington, Vt., bridge and road, to Northern Steel Co., Boston.

100 Tons, Greenwich, Conn., addition, Grass Island sewage treatment plant, to Concrete Steel Co., New York.

NEW REINFORCING BAR PROJECTS

1400 Tons, Cleveland, East and West approaches for Main Street bridge. Bids soon on part of East approach.

310 Tons, Chicago, sanitary district, southwest sewage treatment plant; bids June 9.

300 Tons, Wauwatosa, Wis., high school, revised plans.

280 Tons, Jefferson City, Mo., auxiliary prison; E. C. Childers Construction Co., Jefferson City, low bidder.

250 Tons, Little Rock, Ark., auditorum; William Peterson Construction Co., Little Rock, low bidder.

250 Tons, Canton, Ohio, Timken Technical High School; plans ready about June 15.

250 Tons, Clarksville and Pittsburgh, N. H., reservoir.

225 Tons, Canton, Ohio, Timken Technical High School.

200 Tons, Parco, Wyo., Kendrick project (Invitation 22348-A); bids opened.

190 Tons, Odair, Wash., Grand Coulee project (Invitation 38071-A); bids opened.

145 Tons, Mills, Wyo., Kendrick project (Invitation 22349-A); bids opened.

120 Tons, Marysville, Cal., highway bridge; bids June 15.

Armco Denies CIO Charges Filed With NLRB Against Ashland Plant

MIDDLETOWN, OHIO.—"The charges filed against our Ashland, Ky., plant are entirely unjustified," stated C. H. Murray, assistant to president of the American Rolling Mill Co., when asked to comment upon complaints filed with the Cincinnati regional office of the National Labor Relations Board by the Steel Workers Organizing Committee local of Ashland, a CIO affiliate.

"These complaints are apparently the aftermath of the unsuccessful attempts of the CIO to enlist members in our company's plants.

"On April 22, just six weeks ago, on request of the CIO, the National Labor Relations Board conducted an election in our Butler, Pa., plant which resulted in an overwhelming defeat for the CIO of nearly 3½ to 1. The major purpose of the present complaint is obviously an attempt to outlaw the plan of employee representation which has operated successfully for so many years.

"There is no labor trouble in this plant. In fact, since the company was organized 37 years ago, no Armco employee has ever lost an hour's wages due to labor disputes. None of the charges filed involves wages or working conditions. We have never discriminated against any member of any labor organization in making layoffs. Those who have been laid off were laid off due to the necessity for reducing organization on account of depressed business conditions. As to brutally assaulting union organizers, anyone familiar with conditions in Ashland knows that is ridiculous.

"It is charged that we have attempted to dominate and influence civic, business and patriotic groups in the community. For many years before the CIO was ever dreamed of, it has been the policy of the American Rolling Mill Co. to cooperate with all groups in every community in which we operate a plant in order to improve living conditions. We will leave it to these groups to determine whether or not they have been dominated.

"We welcome a thorough investigation of any of our activities," Mr. Murray said. "The public is entitled to know the truth. If there is any doubt in the minds of the Labor Board or the CIO, as to the sentiment of the Armco men in Ashland we suggest that an election be called immediately. We will readily consent to an election, just as did in Butler."

Machinery Exports Above Last Year

WASHINGTON.—United States exports of industrial machinery during April were valued at $23,672,566, a 10 per cent increase over the corresponding shipments in April, 1937, valued at $21,518,980, according to the machinery division of the Department of Commerce.

Shipments of power-driven metalworking machinery aggregated $7,861,515 during April compared with $5,119,671 in April, 1936. Greater exports were made of practically all types, particularly the following: Turret lathes, $937,923 compared with $209,899 in April, 1937; boring mills and chucking machines, $409,056 compared with $209,899 in April, 1937; milling machines, $1,071,305 compared with $783,081; vertical drilling machines, $139,679 compared with $47,691; radial drilling machines, $93,643 compared with $16,824; planers and shapers, $148,534 compared with $27,101; surface grinding machines, $328,892 compared with $216,352; external cylindrical grinding machines, $40,843 compared with $116,143; internal grinding machines, $446,112 compared with $224,992; other grinding machines, $539,747 compared with $393,675; and forging machinery, $342,942 compared with $128,788.

Fabricated Steel

(CONTINUED FROM PAGE 88)

700 Tons, Hammond, Ind., plant buildings, American Steel Foundries.

500 Tons, Chicago, exhibition home, municipal pier.

415 Tons, State bridge FA-146-A.

200 Tons, Osage, Iowa, State plate girder bridge, FAP-368.

200 Tons, Toledo, Ohio, Coca Cola bottling works; A. Bentley & Sons Co., general contractor.

135 Tons, Chicago, decorative arts building, Chicago Arts Institute.

WESTERN STATES

2435 Tons, State of California, bridges for Union Pacific Railroad Co., Nos. 191.18, 196.12, 192.27 and 160.39.

1200 Tons, Hickman Field, T. H., hangar repairs; bids June 30.

1018 Tons, Grand Coulee Dam, Wash., stop log guides; A. J. O'Leary & Son, Chicago, low bidder.

500 Tons, Tacoma, Wash., building for American Smelting & Refining Co.

390 Tons, Astoria, Ore., cannery.

350 Tons, Tacoma, Wash., converter hoods and flue for American Smelting & Refining Co.

FABRICATED PLATES

AWARDS

1050 Tons, Detroit, 44 cone roof tanks for Standard Oil Co. of New Jersey, to Chicago Bridge & Iron Works, Chicago.

870 Tons, Washington, 36-in. water main, to Alco Products Co., Washington.

415 Tons, East Boston, Mass., three oil tanks for State Fuel Co., to Chicago Bridge & Iron Works, Chicago.

270 Tons, State of Washington, Bureau of Reclamation, pipe and fittings, to R. Hardesty Mfg. Co., Denver.

210 Tons, Bangor, Me., tanks for Bancroft & Martin Rolling Mills, to Chicago Bridge & Iron Works, Chicago.

195 Tons, Greybull, Wyo., dam pipe, to Thompson Mfg. Co., Denver.

SHEET PILING

AWARDS

900 Tons, Los Angeles, United States Engineer (Proposal 541), to Bethlehem Steel Co., Los Angeles.

War Aircraft Plant Planned for Canada

TORONTO.—Miller-Bellanca Aircraft Corp., which opened an office in Montreal, Que., a few months ago, plans to establish a plant later in 1938 for production of military planes whose design already has been submitted to the British and French governments. Frank Bellanca has been in Montreal selecting a location. One plane to be produced will be a twin-bodied passenger or bomber plane powered with two 1000-hp. motors in tandem, having a speed of 300 m.p.h. Mr. Bellanca states that Britain and France will look to Canada for airplanes, as United States Army and Navy authorities cannot give an export release on a military plane until after they have had exclusive use for at least six months.

Tungsten Carbide Tool Co. (division of Michigan Tool Co.), Midwest Tool & Mfg. Co., and the Morse Tool Co., all of Detroit, have signed dealer contracts with Vascoloy-Ramet Corp., North Chicago, Ill.

. . PHILADELPHIA . .

. . . Holiday drives operations down to 21 per cent in eastern Pennsylvania . . . Sellers discouraged as buying drops off . . . Construction steel markets show flurry of activity . . . Shipbuilding tonnages may soon be released . . . Scrap continues on firm side.

PHILADELPHIA, June 1.—Even though the average of district steel making operations now hovers in the neighborhood of 24 per cent, adjustment for the Monday holiday has served to bring the current week's operating figure down to near 21 per cent. The past fortnight has witnessed a noticeable decline in consumer inquiry, the result being that mill books are today more spotty than they have been for some months. Consequently, even at a 24 per cent open hearth operation there is some stocking of ingots, and unless a pickup in mill bookings occurs, which at the moment seems unlikely, this district will likely see additional curtailment in steel refining activity before the middle of June.

Mills here have given up hope of an early revival of railroad purchasing, and rumors to the effect that Detroit automobile makers will soon close down completely for two months has pretty well cancelled any expectation of growing support from that quarter. Construction activity continues far under seasonal levels, and miscellaneous consumption is now very hesitant and spotty. The probable better tin plate shipments during the summer months will likely not be reflected in mill rollings, as considerable stock has been accumulated. About the only way mills here can turn for tonnages is toward the shipyards, which are expected to release some attractive specifications over the next two months.

Pig iron is well nigh inactive, the general adherence to published price levels serving to force more mills and miscellaneous consumers to the use of far cheaper cast iron scrap. J. & L., which has never bothered much about pig iron outlets in this area, has decided to offer iron here in the future, and has already taken one small order. Scrap dealers and brokers alike report more activity in heavy melting steels and heavy cast grades, and prices are generally firm at the moment despite discouraging reports from other areas.

The construction steel markets are showing a slight flurry of activity, but prices on formed material are without doubt taking a bad beating. Bids went in today on the Fox Memorial Building and the Hahnemann Medical College building, both in Philadelphia and calling for 260 tons and 550 tons of shapes respectively. The week's awards included 130 tons for a Y.M.C.A. at Carneys Point, N. J., to Bethlehem Fabricators, Inc.; 190 tons for a Sun Oil Co. building at Marcus Hook, Pa., to Belmont Iron Works; and 190 tons for a Hohenadel Brewery bottling house in Philadelphia to Fort Pitt Bridge Works. Reinforcing bar inquiry is confined to very small tonnages, and the week's only award was 100 tons to the local Navy Yard.

Imports

The following iron and steel imports were received here during the past week: 500 tons of ferrochrome from Japan; 73 tons of steel bands, 25 tons of steel bars and 237 tons of structural shapes from France; 109 tons of steel bands, 124 tons of steel bars and 481 tons of structural shapes from Belgium.

. . SAN FRANCISCO . .

. . . Miscellaneous public lettings the chief steel activity.

SAN FRANCISCO, May 31.—No large private projects loom on the steel horizon here, but public buying continues to be consistent.

A. J. O'Leary & Son, Chicago, was low bidder on stop log guides for Grand Coulee Dam. Listed shipping weight was 1018 tons. On a contractor's letting, three 140-ton closure gates for the dam were awarded to Pacific Car & Foundry Co., Seattle. Further gate tonnage will be awarded as the work progresses.

Bids will be taken June 30 on repair hangars at Hickman Field, T. H., requiring approximately 1200 tons of structural steel and a small quantity of reinforcing bars.

The effect of early March floods is being felt in the reinforcing bar and sheet piling market in California. Several State highway bridges are up for letting, and the United States Engineer, Los Angeles, has awarded 900 tons of piling, for use in flood control work, to Bethlehem Steel Co. This is one of a series of similar awards by this agency.

The East Bay Municipal Utility District, Oakland, Cal., has awarded 1500 tons of 4, 6, 10, 12, and 16-in. cast iron pipe to the United States Pipe & Foundry Co. San Francisco, and 400 tons of 8-in. pipe to American Cast Iron Pipe Co., San Francisco.

. . . . ST. LOUIS . . . .

. . . Farms taking more galvanized sheets . . . Ingot output up slightly.

ST. LOUIS, May 31. — Reports from the Southwest are that warehouse interests are doing a good job right now in corrugated and galvanized sheets, which are being used for repair work on farms. Locally, demand for all finished steel is light. Fabricators of structural steel report that very little is pending.

Oettinger Brothers, Hinton, Okla., are low bidders on a highway bridge at Oklahoma City, requiring 1000 tons of structural. William Peterson Construction Co., Little Rock, is low bidder on the Auditorium there, requiring 800 tons of structurals and 250 tons of reinforcing bars, but it is understood that the bid exceeds the estimate. E. C. Childers Construction Co., Jefferson City, Mo., has been awarded the contract for a new auxiliary prison near there, requiring 280 tons of reinforcing bars.

A district steel mill which has been down for several weeks, put on two of its furnaces, adding a few points to ingot operations.

The reaffirmation of present prices on pig iron for the third quarter has not stimulated buying, nor is it expected to do so, but it has given more confidence to the trade. Buying during the last week was confined to a few carloads here and there. Stove plants are operating about three days a week.

. . . . NEW YORK. . . .

. . . Volume of orders declines . . . May business generally below that of April except for companies selling construction steel . . . Sheet sales 10 to 15% below those of April.

NEW YORK, June 1.—Poor as steel business has been for many months, it became definitely worse last week for most companies that sell in this district. May business as a whole was less than that of April. Only those companies that make a good deal of steel for construction purposes had May sales totals anywhere near equaling April's. Construction activity is below normal for this time of year, but it is furnishing relatively a larger volume of steel orders than other major consuming channels.

Pig Iron

The reaffirmation of present prices on third quarter business has had no favorable effect on sales; in fact, the week just passed was one of the dullest ever experienced in this district, according to local sales offices. The analyses of the few small tonnages that were purchased indicate that the iron was bought primarily for mixing purposes. The only encouraging factor in the market is that consumption is substantially in excess of shipments. Melters' stocks are, consequently, being continually worked lower. Slackening industrial activity abroad, together with the imposition of duties by England on all imported iron is limiting current export inquiry to small tonnages of unusual analyses.

Reinforcing Bars

Awards in the past week were less than half the volume of the previous week and in all instances covered publicly financed projects. Private activity is limited to small alteration jobs. Small lot inquiries are fairly numerous, but as the average tonnage involved in these inqiuries is under 10 tons, the aggregate of this business has little effect on general market conditions.

Sheets

Sheet volume in May ran under that of April by 10 to 15 per cent, and sellers are discouraged as to the immediate outlook. With order lots getting smaller, a fair amount of tonnage that would ordinarily be placed with mills direct is being bought through jobbers, and for this reason, several of the jobbers are moving much more material than earlier in the year. Stove makers are the most active of sheet users, while some refrigerator accounts are still specifying against orders placed last year.

. . . BOSTON. . .

. . . Pig iron sales improve . . . Foundry situation more hopeful.

BOSTON, May 31.—Although business is a long way from active, pig iron is selling better than it did a month ago, the reaffirming of prices for the third quarter undoubtedly having helped quite a lot. Sales the past week included two lots of slightly more than 150 tons each, part for third quarter delivery, and Buffalo and Atlantic Coast brands for prompt shipment, the aggregate footing around 1200 tons. The New England foundry situation is more hopeful, although the rate of melt has not increased more than 5 per cent. Stove manufacturers report the poorest spring business on record.

The Boston & Albany Railroad locomotive repair shops at West Springfield, Mass., are closed indefinitely, the third closing this year, and about 300 men are out of work.

. . . CINCINNATI. . .

. . . Galvanized sheets still in best demand among flat rolled products.

CINCINNATI, May 31.—Demand for galvanized sheets is holding up at a fairly good rate, being equal to about 50 per cent of mill capacity in this district. Orders for other grades of sheets have improved slightly within the past week following announcement of revised prices for third quarter.

No active interest in pig iron is apparent, although melters' inventories are believed to be at a low point. Foundries are averaging two heats a week. Machine tool foundries are doing better than other classes of melters.

Prices on foundry grades of coke have been reaffirmed for June delivery in Cincinnati at $10.50.

Sales of steel out of warehouse have touched a new low level for the year.

. . GREAT BRITAIN. .

. . . Tin Plate Cartel, America participating, renewed for three years . . . Large unsold pig iron stocks in England.

LONDON, June 1 (*By Cable*).—The International Raw Steel Cartel is reported to have reached no decisive conclusions regarding renewal owing to the persistence of one Belgian works, which represents only 6 per cent of the total Belgian output, in claiming increased quota. Such an attitude is considered untenable and there will be a further meeting in Paris on June 16. Arrangements with America are believed to be confirmed. It is unofficially reported that the Cartel expiration date has been prolonged until June 15.

The International Tin Plate Cartel has been renewed for a further three years. It is unofficially reported that American mills have been granted a small quota increase.

The British Government has decided against the establishment of a pig iron reserve.

British foundry and forge pig iron prices have been reaffirmed for the whole of 1938. Pig iron demand is negligible. Makers are holding vast unsold stocks. Four more Northeast Coast furnaces are being damped and some coke ovens stopped. Steel output is now being curtailed and there are large stocks of semi-finished steel.

Big armament orders are expected shortly but these will only absorb certain classes of stocks. Export demand is negligible. Home constructional business is dwindling.

The Welsh tin plate market is quiet. The Argentine Government is inquiring for 1000 tons of black sheets.

Australian local strike settled and no further outside purchases expected. It is believed that the total orders placed outside Australia barely amounted to 20,000 tons.

. . .NON-FERROUS. . .

. . . Copper sentiment bolstered by drop of 11,549 tons in foreign stocks . . . Cut of $5 a ton in lead prices fails to stimulate buying . . . Zinc sales decline further.

NEW YORK, June 1.—Sales of non-ferrous metals continue to reflect depressed conditions in the consuming trades. Sentiment in the copper market was bolstered in the past week by the issuance of the April foreign statistics which showed a decline in stocks of 11,549 tons. The April figure of 185,916 tons compares with 183,787 in April, 1937. Apparent consumption abroad gained slightly in April to 129,577 tons, as compared with 125,269 tons in March and 120,993 tons in April, a year ago. Sales to the foreign group have been in good volume, averaging close to 3000 tons a day. Despite this good volume, foreign prices declined during the week and this morning were in the neighborhood of 8.32c. per lb., c.i.f., usual base ports, 33 points below the price of a week ago. Domestically, demand is very light, with inter-company transactions accounting for the bulk of each day's business. Prices are steady at 9c. per lb., Connecticut Valley, for electrolytic metal, with limited outside offerings at 8.75c.

The Week's Prices. Cents Per Pound for Early Delivery

	May 25	May 26	May 27	May 28	May 31	June 1
Electrolytic copper, Conn.*	9.00	9.00	9.00	9.00	9.00	9.00
Lake copper, N. Y.	9.125	9.125	9.125	9.125	9.125	9.125
Straits tin, spot, New York	36.75	36.125	35.70	....	36.75	37.50
Zinc, East St. Louis	4.00	4.00	4.00	4.00	4.00	4.00
Zinc, New York	4.39	4.39	4.39	4.39	4.39	4.39
Lead, St. Louis	4.10	4.10	3.85	3.85	3.85	3.85
Lead, New York	4.25	4.25	4.00	4.00	4.00	4.00

***Delivered Connecticut Valley; price ¼c. lower delivered in New York.**
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 13.75c. a lb., prompt, f.o.b., New York.
Antimony, American, 11.75c. per lb., prompt shipment, New York.
Quicksilver, $82.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 9.25c. a lb., less carload, delivered in Middle West **¼c. a lb. is added on orders for less than 40,000 lb.**

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	38.00c. to 39.00c.
Tin, bar	40.00c. to 41.00c.
Copper, Lake	10.00c. to 11.00c.
Copper, electrolytic	10.00c. to 11.00c.
Copper, castings	9.50c. to 9.75c.
*Copper sheets, hot-rolled	17.125c.
*High brass sheets	15.625c.
*Seamless brass tubes	18.375c.
*Seamless copper tubes	17.625c.
*Brass rods	11.625c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.50c.
Lead, American pig	5.00c. to 6.00c.
Lead, bar	5.75c. to 6.125c.
Lead, sheets, cut	7.25c.
Antimony, Asiatic	15.50c. to 16.50c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	28.00c. to 30.00c.
Babbitt metal, commercial grade	19.00c. to 49.00c.

***These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.**

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	40.75c.
Tin, bar	42.75c.
Copper, Lake	10.00c. to 10.25c.
Copper, electrolytic	10.00c. to 10.25c.
Copper, castings	9.75c.
Zinc, slabs	7.00c. to 7.25c.
Lead, American pig	4.50c. to 4.75c.
Lead, bar	7.75c.
Antimony, Asiatic	17.75c. to 18.00c.
Babbitt metal, medium grade	17.75c.
Babbitt metal, high grade	44.75c.
Solder, ½ and ½	24.75c.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.25c.	7.00c.
Copper, hvy. and wire	5.50c.	6.00c.
Copper, light and bottoms	4.875c.	5.125c.
Brass, heavy	3.25c.	3.75c.
Brass, light	2.375c.	3.125c.
Hvy. machine composition	5.00c.	6.50c.
No. 1 yel. brass turnings	3.75c.	4.75c.
No. 1 red brass or compos. turnings	4.50c.	5.00c.
Lead, heavy	3.25c.	3.625c.
Cast aluminum	5.00c.	6.25c.
Sheet aluminum	9.25c.	10.75c.
Zinc	1.625c.	2.875c.

Tin

The susceptibility of the market to outside influences caused erratic price movements during the week, while buying showed no deviation from the low levels of the past several months. Drifting lower earlier in the week, tin prices recovered sharply over the week end to 37.50c., today's quotation on Straits metal in New York. The recovery was occasioned by advices to the effect that voting in the Malayan referendum was two to one in favor of the pool, and that the International Tin Control Committee will soom announce another cut in the market quota, in addition to a 15 per cent cut for the buffer pool stock.

Zinc

Prime Western sales last week, extending the downward trend of the past month, amounted to 1003 tons, or 920 tons below the preceding week. Shipments, however, were slightly higher at 2747, and undelivered contracts now stand at 22,602 tons. Buying continues to be governed by maturing needs, with spot deliveries predominating. Domestic quotations are unchanged at 4.39c. per lb., New York, while the London price was off slightly this morning to 2.62c. per lb. for nearby positions.

Lead

On Friday the American Smelting & Refining Co. lowered quotations to 4c. per lb., New York, in an effort to stimulate demand, and was immediately followed by other interests. The reduction has apparently failed to have the desired effect on demand and the week's volume of sales showed little change from the previous week. July books were opened today but created little interest outside of an occasional carlot. In sympathy with the other non-ferrous metals, prices in London declined this morning to 2.94c. per lb. in a flat market.

Average Prices

The average prices of the major non-ferrous metals in May, as based on quotations appearing in THE IRON AGE, were as follows:

	Per lb.
Electrolytic copper, Conn. Valley	9.60c.
Lake copper, Eastern delivery	9.725c.
Straits tin, spot, New York	36.83c.
Zinc, East St. Louis	4.04c.
Zinc, New York	4.43c.
Lead, St. Louis	4.25c.
Lead, New York	4.40c.

Julio F. Sorzano, manager of industrial sales of the Wailes Dove-Hermiston Corp., New York City, announces appointment of A. Y. McDonald Mfg. Co. in Minneapolis, Omaha, Sioux City and Cheyenne as distributer of the Bitumastic line of industrial protective coatings. Bitumastic products are now sold by the A. Y. McDonald Mfg. Co. not only at the four points listed above, but also in Kansas City and Joplin (Mo.) and at Hutchinson (Kan.).

IRON AND STEEL SCRAP

. . . Market still exhibiting weakness in most districts
. . . Composite declines 8c. to $11.17.

JUNE 1.—Although prices are nominally unchanged at Chicago and Philadelphia because of inactivity, weakness in the Pittsburgh market has reduced the price of No. 1 steel 25c. and has lowered THE IRON AGE composite 8c. to $11.17, new low for the year and equal to prices prevailing in the latter part of July, 1935. Railroad grades are also softer at Pittsburgh and at Cleveland, where some items are off as much as $2. General grades at Cleveland are down 50c. from last week. The Cincinnati market is nominally off 25c. Buffalo prices are unchanged, but the principal consumer has lowered its offering price 50c. on No. 1 steel, to $10.50. Perhaps the only sign of strength can be seen at Detroit, where Chrysler bundles brought $7.50 on cars, equal to what a local mill has been paying on a delivered basis.

The European Scrap Cartel met and adjourned at Rome last weekend, without any new orders resulting, although exporters will now attempt to dig up business through individual follow-up work.

Pittsburgh

Additional sales of No. 1 steel have been made to a consumer at $11 a ton in the past week. Total tonnage of this grade bought at $11 a ton in the past 10 days approximates 1500 tons. Yard dealers continue to liquidate stocks to some extent and the lack of substantial consumer buying, coupled with an abnormally low ingot rate, in this district do not present an optimistic outlook for scrap in the immediate future. The market has turned slightly softer in the past few days, with a small tonnage of No. 1 steel sold into consumption at $10.75 a ton. Railroad heavy melting is lower on the basis of recent railroad list sales.

Chicago

Inactivity has about reached its lowest possible point as brokers who ordinarily conduct upward of 80 per cent of their business by telephone report receiving only one and two calls a day. All prices are nominal with No. 1 steel being listed at $10.50 to $11. Some in the trade say mills will not buy even at $10 and inasmuch as one of the principal consumers here has lately reduced operations considerably, this statement takes on added strength, as the demand for old material is nonexistent. A further reduction in price is not being made, however, because the consumer mentioned above plans to add more furnaces this week, although operations still will be under last week's level.

Cleveland

In sympathy with downward revisions in other districts, prices this week are lower in Cleveland. The entire market is inactive. Scrap is not coming in to dealers as fast as ordinarily, due to less production and the low prices prevailing. The monthly railroad lists are small.

Buffalo

The largest area consumer, which has continued its buying program over the past few months with few interruptions, has reduced its offering price to $10.50 for No. 1 heavy melting steel and $8.50 for No. 2 heavy melting steel and $9 for new hydraulic compressed sheets. This action came after the mill had acquired about 4500 tons at prices of $11, $9, and $9.50 respectively.

St. Louis

With prices in the St. Louis market relatively higher than prevail elsewhere, there has been a heavy movement of scrap iron to dealers here to fill recent orders totaling 10,000 tons. No new business is pending. Railroad lists include St. Louis-Southwestern, and New York, Chicago & St. Louis, 1000 tons each and Missouri-Kansas-Texas, 2000 tons.

Cincinnati

While scrap prices are nominal, dealers felt current weakness indicated lower quotations and accordingly bids the past week receded 25c. Material, however, is being closely held in yards and virtually no distress scrap has appeared. One mill is taking some sheet clips on old commitments, but otherwise the market is without activity.

Detroit

Closing of automotive scrap lists late last week and early this week brought prices in line with those previously quoted for the Detroit market, with a little stiffening on some items, including hydraulic compressed sheets, which sold at $7.50 on the Chrysler list. In view of the fact that a local mill has been buying bundles at $7.50 delivered, the Chrysler price indicates minor strength. The improved sentiment is attributed to the small quantities of scrap being produced in this area. The reawakened buying interest of a local consumer and aroused speculative interest based on a growing belief that midsummer will see an upturn in steel mill output.

New York

The meeting of the European Scrap Cartel in Rome broke up Sunday evening without any definite commitments being made as to future buying. There is still a possibility that some business may be uncovered through individual follow-up work, although Italy appears to be the only country in need of scrap now. Meanwhile, export buying prices at New York are unchanged from last week. The domestic market is weaker and prices on Nos. 1 and 2 steel have been marked down 25c. in line with carlot sales made to mills in eastern Pennsylvania. Foundry cast grades are also weaker.

Boston

A Pittsburgh district steel mill is offering $3.85 a ton on cars for bundled skeleton, but brokers are reluctant to sell. Last previous prices paid for such material were $4.25 to $4.35 a ton on cars. Because of its relative cheapness to pig iron, New England foundries are buying textile and machinery cast a little more freely in practically all sections except Rhode Island and southern Massachusetts. The scrap market otherwise is virtually at a standstill. The quartermasters at Fort Devens, Mass., and Fort Ethan Allen, Vt., and the commanding officer at the Springfield, Mass., armory are taking bids on tonnages of millings, turnings and miscellaneous scrap.

Philadelphia

Both brokers and dealers here are firmly resisting the depressed mill sentiment arising from the continued drop in the national steel making rate. Whether this resistance will be maintained for some time or will disappear within a week or so is impossible to determine at the moment. In any case, the market here both for Nos. 1 and 2 heavy melting steel and heavy cast grade is if anything on the firm side at quotable price levels, this tone being set by the release of shipments of No. 1 and No. 2 to Coatesville, the absence of any distress material of importance, the unwillingness of dealers to process material at prices lower than those now ruling, and the possibility that some new export demand, probably from Italy, may materialize in the summer months. Bethlehem is doing little at the moment; Coatesville, Claymont and Harrisburg are all taking deliveries, and Phoenix is somewhat aloof in view of its comfortable backlog recently secured from Pencoyd.

Harvey B. Mann, long identified with De Laval and Cochrane sales in the Pittsburgh district, announces that he has established an office under the name—Mann Engineering Co., at 429 Penn Avenue, Pittsburgh, to represent the following manufacturers of engineering equipment: Fischer & Porter Co., rotameters; Fuller Co., rotary compressors and vacuum pumps; Richardson Scale Co., automatic coal scales; Springfield Boiler Co., water-tube boilers; Sterling Engine Co., gasoline, gas and Diesel engines; and Bin Dictator Co., bin level indicator switches.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	$10.50 to $11.00
Railroad hvy. mltng...	12.00 to 12.50
No. 2 hvy. mltng. steel.	9.50 to 10.00
Scrap rails	13.50 to 14.00
Rails 3 ft. and under..	15.50 to 16.00
Comp. steel	10.50 to 11.00
Hand bundled sheets..	9.50 to 10.00
Hvy. steel axle turn...	9.00 to 9.50
Machine shop turn....	6.50 to 7.00
Short shov. turn.....	6.50 to 7.00
Mixed bor. & turn.....	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Cast iron carwheels...	12.50 to 13.00
Hvy. breakable cast...	11.00 to 11.50
No. 1 cupola cast.....	13.00 to 13.50
RR. knuckles & cplrs..	14.00 to 14.50
Rail coil & leaf springs	14.25 to 14.75
Rolled steel wheels....	14.25 to 14.75
Low phos. billet crops.	14.75 to 15.25
Low phos. punchings.	13.00 to 13.50
Low phos. plate	12.50 to 13.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	$12.00
No. 2 hvy. mltng. steel.	$9.50 to 10.00
Hydraulic bund., new.	11.50 to 12.00
Hydraulic bund., old..	8.50 to 9.00
Steel rails for rolling..	16.00 to 16.50
Cast iron carwheels...	14.50 to 15.00
Hvy. breakable cast...	12.25 to 12.75
No. 1 cast	14.00 to 14.50
Stove plate (steel wks)	10.00 to 10.50
Railroad malleable	15.00 to 15.50
Machine shop turn....	.... 6.50
No. 1 blast furnace....	.... 6.00
Cast borings	.... 6.00
Heavy axle turnings...	8.50 to 9.00
No. 1 low phos. hvy....	16.50 to 17.00
Couplers & knuckles..	15.50 to 16.00
Rolled steel wheels....	15.50 to 16.00
Steel axles	20.00 to 20.50
Shafting	18.50 to 19.00
No. 1 RR. wrought....	15.00 to 15.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire.....	11.00 to 11.50
Cast borings (chem.)..	10.00 to 10.50

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel.....	$10.50 to	$11.00
Auto. hvy. mltng. steel alloy free	9.00 to	9.50
No. 2 auto. steel	8.50 to	9.00
Shoveling steel	10.50 to	11.00
Hydraul. comp. sheets	9.50 to	10.00
Drop forge flashings...	8.25 to	8.75
No. 1 busheling	9.25 to	9.75
No. 2 busheling, old...	3.75 to	4.25
Rolled carwheels	13.00 to	13.50
Railroad tires, cut....	14.50 to	15.00
Railroad leaf springs..	14.00 to	14.50
Steel coup. & knuckles	13.00 to	13.50
Axle turnings	10.00 to	10.50
Coil springs	14.50 to	15.00
Axle turn. (elec.).....	10.00 to	10.50
Low phos. punchings..	13.50 to	14.00
Low phos. plates, 12 in. and under	12.50 to	13.00
Cast iron borings	3.50 to	4.00
Short shov. turn.....	5.00 to	5.50
Machine shop turn....	3.50 to	4.00
Rerolling rails	13.75 to	14.25
Steel rails under 3 ft..	14.00 to	14.50
Steel rails under 2 ft..	14.50 to	15.00
Angle bars, steel.....	12.50 to	13.00
Cast iron carwheels...	12.25 to	12.75
Railroad malleable ...	11.75 to	12.25
Agric. malleable	10.00 to	10.50
	Per Net Ton	
Iron car axles	$16.50 to	$17.00
Steel car axles	15.00 to	15.50
No. 1 RR. wrought....	8.00 to	8.50
No. 2 RR. wrought....	9.25 to	9.75
Locomotive tires	14.25 to	14.75
Pipes and flues	7.75 to	8.25
No. 1 machinery cast..	10.50 to	11.00
Clean auto. cast.....	9.50 to	10.00
No. 1 railroad cast....	9.75 to	10.25
No. 1 agric. cast.....	9.50 to	10.00
Stove plate	7.00 to	7.50
Grate bars	7.00 to	7.50
Brake shoes	6.50 to	7.00

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	$10.50 to $11.00
Hydraulic bundles	10.00 to 10.50
Machine shop turn....	6.50 to 7.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	$9.50 to $10.00
No. 2 hvy. mltng. steel.	8.50 to 9.00
Comp. sheet steel	9.00 to 9.50
Light bund. stampings.	6.50 to 7.00
Drop forge flashings...	8.00 to 8.50
Machine shop turn....	5.00 to 5.50
Short shov. turn.....	5.50 to 6.00
No. 1 busheling	8.00 to 8.50
Steel axle turnings....	7.50 to 8.00
Low phos. billet and bloom crops	14.00 to 14.50
Cast iron borings	5.00 to 5.50
Mixed bor. & turn....	5.00 to 5.50
No. 2 busheling	5.00 to 5.50
No. 1 cast	12.50 to 13.00
Railroad grate bars ..	6.50 to 7.00
Stove plate	6.00 to 6.50
Rails under 3 ft.	14.00 to 14.50
Rails for rolling.....	12.00 to 12.50
Railroad malleable	11.50 to 12.00
Cast iron carwheels...	12.00 to 12.50

BUFFALO

No. 1 hvy. mltng. steel.	$10.50 to $11.00
No. 2 hvy. mltng. steel.	8.50 to 9.00
Scrap rails	12.00 to 12.50
New hvy. b'ndled sheets	9.00 to 9.50
Old hydraul. bundles..	7.50 to 8.00
Drop forge flashings..	8.50 to 9.00
No. 1 busheling	8.50 to 9.00
Hvy. axle turnings....	8.50 to 9.00
Machine shop turn....	4.50 to 5.00
Knuckles & Couplers..	14.00 to 14.50
Coil & leaf springs....	14.00 to 14.50
Rolled steel wheels....	14.00 to 14.50
Low phos. billet crops.	15.00 to 15.50
Shov. turnings	6.00 to 6.50
Mixed bor. & turn....	4.50 to 5.00
Cast iron borings	4.50 to 5.00
Steel car axles	14.00 to 14.50
No. 1 machinery cast.	13.00 to 13.50
No. 1 cupola cast.....	12.00 to 12.50
Stove plate	10.50 to 11.00
Steel rails under 3 ft..	15.00 to 15.50
Cast iron carwheels...	12.00 to 12.50
Railroad malleable ...	11.50 to 12.00
Chemical borings	7.50 to 8.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$10.25 to $10.75
No. 1 hvy. melting....	10.25 to 10.75
No. 2 hvy. melting....	9.75 to 10.00
No. 1 locomotive tires.	11.50 to 12.00
Misc. stand. sec. rails.	11.00 to 11.50
Railroad springs	13.00 to 13.50
Bundled sheets	5.50 to 6.00
No. 1 busheling	5.50 to 6.00
Cast bor. & turn.....	1.50 to 2.00
Machine shop turn....	2.00 to 2.50
Heavy turnings	7.00 to 7.50
Rails for rolling	13.00 to 13.50
Steel car axles	17.00 to 17.50
Iron car axles	19.50 to 20.00
No. 1 RR. wrought....	7.50 to 8.00
No. 2 RR. wrought....	10.00 to 10.50
Steel rails under 3 ft...	13.00 to 13.50
Steel angle bars	11.00 to 11.50
Cast iron carwheels...	11.50 to 12.00
No. 1 machinery cast..	11.00 to 11.50
Railroad malleable	10.50 to 11.00
No. 1 railroad cast	10.00 to 10.50
Stove plate	6.50 to 7.00
Agricul. malleable	9.00 to 9.50
Grate bars	6.50 to 7.00
Brake shoes	6.50 to 7.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$7.75 to $8.25
No. 2 hvy. mltng. steel.	5.75 to 6.25
Scrap rails for mltng.	12.50 to 13.00
Loose sheet clippings.	3.25 to 3.75
Hydrau. b'ndled sheets	7.25 to 7.75
Cast iron borings	1.75 to 2.25
Machine shop turn....	2.25 to 2.75
No. 1 busheling	6.00 to 6.50
No. 2 busheling	1.25 to 1.75
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires.	11.25 to 11.75
Short rails	15.00 to 15.50
Cast iron carwheels...	9.75 to 10.25
No. 1 machinery cast.	9.75 to 10.25
No. 1 railroad cast....	8.25 to 8.75
Burnt cast	4.75 to 5.25
Stove plate	4.75 to 5.25
Agricul. malleable	9.00 to 9.50
Railroad malleable	11.00 to 11.50
Mixed hvy. cast	6.50 to 7.00

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	$11.50 to $12.00
Scrap steel rails	14.00 to 14.50
Short shov. turnings..	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought....	.... 10.00
Rails for rolling	15.00 to 16.00
No. 1 cast	14.00 to 16.50
Tramcar wheels	14.00 to 15.00

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	$6.50 to $7.00
No. 2 hvy. mltng. steel.	5.50 to 6.00
Borings and turnings..	3.00 to 3.50
Long turnings	2.75 to 3.25
Short shov. turnings..	3.50 to 4.00
No. 1 machinery cast..	11.50 to 12.00
Automotive cast	11.50 to 12.00
Hvy. breakable cast...	9.00 to 9.50
Hydraul. comp. sheets.	7.00 to 7.50
Stove plate	6.75 to 7.25
New factory bushel...	6.00 to 6.50
Old No. 2 busheling...	2.00 to 2.50
Sheet clippings	4.00 to 4.50
Flashings	5.50 to 6.00
Low phos. plate scrap.	7.50 to 8.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$7.50 to $7.75
No. 2 hvy. mltng. steel.	5.50 to 5.75
Hvy. breakable cast...	8.00 to 8.50
No. 1 machinery cast..	10.00 to 10.50
No. 2 cast	7.00 to 7.50
Stove plate	6.00 to 6.50
Steel car axles	20.00 to 20.50
Shafting	15.00 to 15.50
No. 1 RR. wrought....	11.00 to 11.50
No. 1 wrought long....	9.50 to 10.00
Spec. iron & steel pipe	8.50 to 9.00
Rails for rolling	16.00 to 16.50
Clean steel turnings*..	2.50 to 3.00
Cast borings*	2.50 to 3.00
No. 1 blast furnace...	2.50 to 3.00
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	4.50 to 5.00
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast	$13.00 to $14.00
No. 2 cast	10.50 to 11.00

*$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.....	$10.00
Scrap rails	10.00
No. 2 steel	9.00
Breakable cast	7.00
Machine shop turn.	1.45
Mixed bor. & turn.	1.25
Bun. skeleton long	3.85
Shafting	13.00
Cast bor. chemical	5.50
Per gross ton delivered consumers' yards:	
Textile cast	$12.00 to $12.50
No. 1 machine cast....	12.00 to 12.50

PACIFIC COAST

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	$11.65 to $12.15
No. 2 hvy. mltng. steel.	10.65 to 11.15

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$10.50	$9.50
No. 2 hvy. mltng. steel.	9.50	8.50
Mixed dealers steel....	8.50	7.50
Scrap pipe	8.50	7.50
Steel turnings	7.50	7.00
Cast borings	8.50	7.50
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	11.00	10.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	$8.50 to $9.50
No. 2 hvy. mltng. steel	7.00 to 8.00
No. 2 cast	7.00
Stove plate	6.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.....	$10.00
No. 2 hvy. mltng. steel.....	9.00
Rails (scrap)	10.00
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel....	Nominal
No. 2 hvy. mltng. steel....	Nominal

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$37.00
Forging quality	43.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$37.00

Skelp

Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	2.10c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh or Cleveland	$47.00
Chicago, Youngstown or Anderson, Ind.	48.00
Worcester, Mass.	49.00
Birmingham	50.00
San Francisco	56.00
Galveston	53.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh	2.45c.
Chicago or Gary	2.50c.
Duluth	2.60c.
Detroit	2.60c.
Cleveland	2.50c.
Buffalo	2.55c.
Philadelphia	2.77c.
New York	2.81c.
Birmingham	2.60c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	3.00c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh	2.30c.
Cleveland, Chicago, Gary or Moline, Ill.	2.35c.
Buffalo	2.40c.
Birmingham	2.45c.
On cars dock Gulf ports	2.70c.
On cars dock Pacific ports	2.85c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh	2.45c.
Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.50c.
Detroit	2.60c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.95c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh	2.30c.
Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.35c.
On cars dock Gulf ports	2.70c.
On cars dock Pacific ports	2.80c.

IRON BARS

Chicago	2.40c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base Per Lb.
Pittsburgh	2.90c.
Cleveland, Chicago and Gary	2.95c.
Buffalo	3.00c.
Detroit	2.95c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base Per Lb.
Pittsburgh	2.25c.
Chicago or Gary	2.30c.
Cleveland	2.45c.
Coatesville or Spar. Pt.	2.35c.
Philadelphia	2.445c.
New York	2.55c.
Birmingham	2.40c.
On cars dock Gulf ports	2.65c.
On cars dock Pacific ports	2.80c.
Wrought iron plates, P't'g	3.80c.

FLOOR PLATES

Pittsburgh	3.50c.
Chicago	3.55c.
Coatesville	3.60c.
On cars dock Gulf ports	3.90c.
On cars dock Pacific ports	4.05c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh	2.25c.
Chicago	2.30c.
Cleveland	2.45c.
Buffalo or Bethlehem	2.35c.
Philadelphia	2.465c.
New York	2.52c.
Birmingham (standard)	2.40c.
On cars dock Gulf ports	2.65c.
On cars dock Pacific ports	2.80c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh	2.60c.
Chicago or Buffalo	2.70c.
On cars dock Gulf or Pacific Coast ports	.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$43.00
Light rails (from rail steel) per gross ton	42.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

NOTE: Following prices superseded by new base quotations of 2.30c., Pittsburgh, and 2.40c., Gary, on hot rolled sheets; 3.35c., Pittsburgh, and 3.45c., Gary, on cold rolled sheets, subject to new list of extras issued May 18. Until June 30 whichever set of base prices and extras yields lower net will apply.

Hot Rolled, 10 Gage

	Base per Lb.
Pittsburgh	2.40c.
Gary	2.50c.
Detroit	2.60c.
Philadelphia	2.72c.
Granite City	2.60c.
Birmingham	2.55c.
On cars dock Pacific ports	2.95c.
Wrought iron, Pittsburgh	4.25c.

Hot Rolled Annealed, 24 Gage

Pittsburgh	3.15c.
Gary	3.25c.
Detroit	3.35c.
Philadelphia	3.47c.
Granite City	3.35c.
Birmingham	3.30c.
On cars dock Pacific ports	3.80c.
Wrought iron, Pittsburgh	5.15c.

Heavy Cold Rolled, 10 Gage*

Pittsburgh	3.00c.
Gary	3.10c.
Detroit	3.20c.
Philadelphia	3.32c.
Granite City	3.20c.
Birmingham	3.15c.
On cars dock Pacific ports	3.60c.

Light Cold Rolled, 20 Gage*

Pittsburgh	3.45c.
Gary	3.55c.
Detroit	3.65c.
Philadelphia	3.77c.
Granite City	3.65c.
Birmingham	3.60c.
On cars dock Pacific ports	4.00c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh	3.80c.
Gary	3.90c.
Philadelphia	4.12c.
Granite City	4.00c.
Birmingham	3.95c.
On cars dock Pacific ports	4.40c.
Wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars dock Pacific ports	4.80c.

Vitreous Enameling Stock, 20 Gage

Pittsburgh	3.50c.
Gary	3.60c.
Granite City	3.70c.
On cars dock Pacific ports	4.10c.

TIN MILL PRODUCTS

NOTE: Base prices for third quarter unchanged, but will apply only to 29 gage and lighter; all other to be governed by sheet base and extras.

Black Plate, 28 Gage

Pittsburgh	3.30c.
Gary	3.40c.
Granite City	3.50c.
On cars dock Pacific ports, boxed	4.175c.

Tin Plate

	Base per Box
Standard cokes, Pittsburgh	$5.35
Standard cokes, Gary	5.45
Standard cokes, Granite City	5.55

Special Coated Manufacturing Ternes

	Base per Box
Pittsburgh	$4.65
Gary	4.75
Granite City	4.85

Roofing Terne Plate
(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

HOT ROLLED STRIP

NOTE: Following prices superseded by new base prices of 2.30c., Pittsburgh, and 2.40c., Gary, subject to new list of extras issued May 18, which provide that base shall apply to strip 12 in. and under; all other to be governed by sheet base and extras. Until June 30 either old or new method may be used.

(*Widths up to 24 in.*)

	Base per Lb.
Pittsburgh	2.40c.
Chicago	2.50c.
Detroit	2.60c.
Granite City	2.60c.
Birmingham	2.55c.

Cooperage Stock

Pittsburgh	2.50c.
Chicago	2.60c.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh	3.10c.
Cleveland	3.10c.
Chicago	3.30c.
Worcester	3.30c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh or Cleveland	3.25c.
Worcester	3.65c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	3.10c.	3.30c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon Over	1.00	8.50c.	8.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $3 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.75
Smooth coated nails	2.75
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$3.15
Galvanized fence wire	3.55
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column.	74
Single loop bale ties, base col...	63

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., are $11 a ton over Pittsburgh; New Orleans, $8; Mobile, Ala., $7; Lake Charles, La., $9 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $11 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	52	31	¼ & ⅜	.+13	+35
¼ to ⅜	..55	38½	½	20	1½
½	....59½	49	¾	26	8
¾	....62½	53	1 & 1¼	..30	14
1 to 3	...64½	55½	1½	34	16½
			2	....33½	16

Lap Weld

2	57	47½	2	....26½	10
2½ & 3	..60	50½	2½ to 3½	27½	12½
3½ to 6	..62	52½	4	....29½	16
7 & 8	..61	50½	4½ to 8.	28½	15
9 & 10	..60½	50	9 to 12	..24½	10
11 & 12	..59½	49			

Butt Weld, extra strong, plain ends

¼	....50½	36½	¼ & ⅜	.+14	+48
¼ to ⅜	..52½	40½	½	21	4
½	....57½	48½	¾	27	10
¾	....61½	52½	1 to 2	..34	17½
1 to 3	63	55			

Lap Weld, extra strong, plain ends

2	55	46½	2	....29½	13½
2½ & 3	.59	50½	2½ to 4	..35	20½
3½ to 6	.62½	54	4½ to 6	..33½	19
7 & 8	..61½	54	7 & 8	..34½	19½
9 & 10	..60½	50	9 to 12	..28	15½
11 & 12	..59½	49			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d.	13 B.W.G.	11.21	9.96
1½ in. .od.	13 B.W.G.	12.38	11.00
1¾ in. o.d.	13 B.W.G.	14.09	12.51
2 in. o.d.	13 B.W.G.	15.78	14.02
2¼ in. o.d.	13 B.W.G.	17.60	15.63
2¼ in. o.d.	12 B.W.G.	19.37	17.21
2½ in. o.d.	12 B.W.G.	21.22	18.85
2¾ in. o.d.	12 B.W.G.	22.49	19.98
3 in. o.d.	12 B.W.G.	23.60	20.97
4½ in. o.d.	10 B.W.G.	45.19	40.15
3½ in. o.d.	11 B.W.G.	29.79	26.47
4 in. o.d.	10 B.W.G.	36.96	32.83
5 in. o.d.	9 B.W.G.	56.71	50.38
6 in. o.d.	7 B.W.G.	87.07	77.35

Extra for less-carload quantities:

40,000 lb. or ft. or over						Base
30,000	lb. or ft.	to	39,999	lb. or ft.		5%
20,000	lb. or ft.	to	29,999	lb. or ft.		10%
10,000	lb. or ft.	to	19,999	lb. or ft.		20%
5,000	lb. or ft.	to	9,999	lb. or ft.		30%
2,000	lb. or ft.	to	4,999	lb. or ft.		45%
Under 2,000 lb. or ft.						65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham.	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in. f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	56.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. & 6 in. and smaller.	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65
9/16 in. to 1 in. inclusive.	60 and 5
1⅛ in. and larger	60

* Less carload lots and less than full container quantity. Less carloads lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon units, U.S.S. and S.A.E.:	
½ in. and smaller	60 and 10
9/16 in. to 1 in. inclusive.	60 and 5
⅛ in. and larger	60
Stove bolts in packages, nuts attached	70
Stove bolts in packages, with nuts separate	70 and 10
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	$3.60
F.o.b. Chicago or Birmingham	3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70 and 5
Upset set screws, cup and oval points	80 and 5
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base..... 3.00c. Delivered, Detroit ..... 3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	0.75
2300 (3½ Nickel)	1.55
2500 (5% nickel)	$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2⅛ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, vents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	20s. 3d. to 21s. 6d.
Steel bars, open hearth.	£11
Beams, open-hearth	£10 12s. 6d.
Channels, open-hearth	£10 17s. 6d.
Angles, open-hearth	£10 12s. 6d.
Black sheets, No. 24 gage.	£13 5s.
Galvanized sheets, No. 24 gage	£16 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet bars	Nominal
Plate ¼ in. and up	£6 7s.
Plate 3/16 in. and 5 mm.	£6 13s.
Sheet, ⅛ in.	£7 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 15s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.70c.
Structural shapes	3.70c.
Soft-steel bars and small shapes	3.80c.
Reinforcing steel bars	2.45c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large .....1 to 24 kegs	$3.65
	Per Cent Off List
Track bolts, all sizes per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb	$4.35
Wire, black, soft ann'l'd, base per 100 lb	$3.30
Wire, galv. soft, base per 100 lb.	$3.70
Common wire nails, per keg	$2.90
Cement coated nails, per keg	$2.90

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	$4.40
Track bolts (keg lots)	5.60
Rivets, structural (keg lots)	**4.95
Rivets, boiler (keg lots)	**5.05
	Per Cent Off List
Machine bolts and carriage bolts, ½ in. and smaller	60
Lag screws	*55 and 5
Hot-pressed nuts, sq. and hex., tap or blank, ½ by 6 in. and smaller	60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	$3.75 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	4.02c.
Structural shapes	3.99c.
Soft steel bars, round	4.16c.
Iron bars, Swed. charcoal	7.50 to 8.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.61c.
Flats up to 12 in. wide	4.61c.
Cold-rolled; strip, soft and quarter hard	3.96c.
Hoops	4.36c.
Bands	4.36c.
Hot-rolled sheets (10 ga.)	4.00 to 4.11c.
Hot-rolled ann'l'd sheets (24 ga.)	4.50c.
Galvanized sheets (24 ga.)	4.75c.
Long terne sheets (24 ga.)	5.50 to 6.20c.
Armco iron, galv. (24 ga.)	6.25c.
Toncan iron, galv. (24 ga.)	6.25c.
Galvanneal (24 ga.)	6.50c.
Armco iron hot-rolled (10 ga.)	4.60c.
Toncan iron, hot-rolled (10 ga.)	4.60c.
Cold-rolled sheets (20 ga.)	
Standard quality	5.20c.
Deep drawing	5.85c.
Stretcher leveled	5.85c.
SAE, 2300, hot-rolled	7.84c.
SAE, 3100, hot-rolled	6.39c.
SAE, 6100, hot-rolled, annealed	10.54c.
SAE, 2300, cold-rolled	9.04c.
SAE, 3100, cold-rolled, annealed	8.59c.
Floor plate, ⅛ in. and heavier	5.62c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	$3.25
	Per Cent Off List
Machine bolts, square head and nut	60
Carriage bolts, cut thread	60
Nuts, hot pressed and cold punched, all types	55

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	4.02c.
Bars, soft steel (rounds and flats)	4.12c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.27c.
Cold-fin. rounds, shafting, screw stock	4.57c.
Hot-rolled annealed sheets (No. 24)	4.87c.
Galv. sheets (No. 24*)	5.52c.
Hot-rolled sheets (No. 10)	4.12c.
Black corrug. sheets (No. 24*)	4.92c.
2 galv. corrug. sheets	5.57c.
Structural rivets	5.32c.
Boiler rivets	5.42c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	50
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, nuts; all quantities	60

* No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.92c.
*Structural shapes	3.92c.
*Soft steel bars, small shapes, iron bars (except bands)	4.03c.
‡Reinforc. steel bars, square and deformed	3.46c.
Cold-finished steel bars	4.56c.
*Steel hoops	4.63c.
*Steel bands, No. 12 and 3/16 in. incl.	4.13c.
*Spring steel	5.50c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	4.90c.
*Hot-rolled annealed sheets (No. 10)	4.03c.
*Diam. pat. floor plates, ¼ in.	5.25c.

These prices are for delivery in Philadelphia trucking area.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.88c.
Soft steel bars	3.75c.
Reinfor. bars (under 2000 lb.)	3.00c.
Cold-fin. bars (1000 lb., over)	4.30c.
Hot-rolled strip, 6 in. wide and under	4.18c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets No. 24 (under 1500 lb.)	4.68c.
Galvanized sheets (No. 24)	5.33c.
Hot-rolled sheets (No. 10)	3.98c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.93c.
Floor plates, 3/16 in. and heavier	5.48c.
*Black ann'l'd wire, per 100 lb.	$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Con. wire nails, base per keg	2.95
	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large (to and incl. 1 in. diam.)	60 and 10
1⅛ in. and larger	60 and 5
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 5 and 5
1⅛ in. and larger	60 and 5

* For 5000 lb. or less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.95c.
Floor plates	5.55c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$3.48
Com. wire nails, base per keg:	
Any quantity less than carload.	3.20
Cement c't'd nails, base 100-lb. keg.	3.50
Chain. lin. per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes, 2-in.	20.73
4-in.	48.41

BUFFALO

	Base per Lb.
Plates	3.95c.
Floor plates	5.55c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.00c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.82c.
Hot-rolled annealed sheets (No. 24)	4.83c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	4.00c.
Galv. sheet (No. 24)	5.38c.
Bands	4.25c.
Hoops	4.25c.
Heavy hot-rolled sheets	4.00c.
Com. wire nails base per keg	$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON

	Base per Lb.
Channels, angles	4.26c.
Tees and zees, under 3 in.	4.51c.
H beams and shapes	4.10c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.11 to 4.61c.
Floor plates, diamond pattern.	5.76c.
Bar and bar shapes (mild steel)	4.26c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.46 to 5.46c.
Half rounds, half ovals, ovals and bevels	5.51c.
Tire steel	5.51c.
Cold-rolled strip steel	3.86c.
Cold-finished rounds, squares and hexagons	4.71c.
Cold-finished flats	4.71c.
Blue annealed sheets, No. 10 ga.	4.21c.
One pass cold-rolled sheets No. 24 ga.	5.16c.
Galvanized steel sheets, No. 24 ga.	5.15c.
Lead coated sheets, No. 24 ga.	6.61c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.55c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)**	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

* Under 400 lb., .50c. over base, 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

** In Detroit only, 1500 to 3749 lb., base less 0.25c.; 3750 to 7499 lb., base less 0.40c.; 7500 lb. and over, base less 0.60c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.88c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.98c.
Soft steel bars, squares and hexagons	4.13c.
Hot-rolled strip	4.23c.
Hot-rolled annealed sheets (No. 24)	4.73c.
Galvanized sheets (No. 24)	5.38c.
Cold-finished steel bars	4.43c.
Structural rivets (keg lots)	5.18c.
Boiler rivets, cone head (keg lots)	5.28c.
Track spikes (keg lots)	4.63c.
Track bolts (keg lots)	5.83c.
Black annealed wire (No. 6 to No. 9 incl.)	3.85c.
Com. wire nails and cement coated nails 100 to 4999 lb.	3.30c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60–5
1⅛ in. and larger	60
Coach and lag screws	60–5
Hot-pressed nuts, sq. and hex. tapped or blank, 1–199 lb.	50
200 lb. and over:	
½ in. and smaller	62½
9/16 to 1 in.	60
1⅛ in. and over	50–10

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BIRMINGHAM

Bars and bar shapes	$3.85	base
Structural shapes and plates	3.75	"
Hot rolled sheets No. 10 ga.	3.80	"
Hot rolled sheets No. 24 ga.	4.40	" 3500 lb. and over
Galvanized sheets No. 24 ga.	5.05	" 3500 lb. or more
Strip	4.05	"
Reinforcing bars	3.85	"
Floor plates	5.96	"
Cold finished bars	4.91	"
Machine and carriage bolts	.50 & 10 off list	
Rivets (structural)	$4.60 base	

On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.04c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.50c.
Galvanized sheets, No. 24, 100 bdls. or more	$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 1999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

Quantity differentials on the basis of combined weight of hot rolled products ordered in one day: Under 100 lb., add $1; 100 to 399 lb., add 50c.; 400 to 1999 lb., base; 2000 to 9999 lb., deduct 20c.; 10,000 to 39,999 lb., deduct 30c.; 40,000 lb. and over, deduct 40c.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.25c.
Iron bars	4.25c.
Reinforcing bars	4.25c.
Reinforcing shapes	4.15c.
Plates	4.15c.
Hot-rolled sheets No. 10	4.20c.
Hot-rolled annealed sheets, No. 24*	4.10c.
Galvanized sheets No. 24*	4.70c.
Steel bands	4.45c.
Cold-finished bars	4.93c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.35c.
Shapes, bar size	4.35c.
Iron bars	4.35c.
Structural shapes	4.25c.
Plates	4.25c.
Hot-rolled sheets, No. 10	4.30c.
Hot-rolled annealed sheets, No. 24	4.95c.
Galvanized sheets, No. 24	5.70c.
Steel bands	4.60c.
Cold-drawn rounds	4.86c.
Cold-drawn flats, squares, hexagons	6.86c.
Structural rivets	5.25c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	$3.55
Bolts and nuts, per cent off list	60

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	2.975c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.25c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.45c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	$3.40	$3.20	$3.40

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$47.50
Chicago District	56.05
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.50
Delivered Newark or Jersey City	26.53
Delivered Philadelphia	25.84
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
Delivered Cincinnati	24.44
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered, San Francisco, Los Angeles or Seattle	26.95
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$25.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.61
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.53
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.00
Delivered Cincinnati	25.61
Delivered Canton, Ohio	25.89
Delivered Mansfield, Ohio	26.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$28.50

Gray Forge

Valley or Pittsburgh furnace	$23.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic 19 to 21%	$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$33.50

For each additional 0.50% silicon up to 17%, 50c. per ton is added.

Manganese 2 to 3%, $1 per ton additional. For each unit of manganese over 3%, $1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$101.50*
2.50% carbon	106.50*
2% carbon	111.50*
1% carbon	121.50*

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$2.00
Ferrotungsten, lots of 500 lbs. nominally	2.05
Ferrotungsten, smaller lots, nominally	2.10
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Sigio), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.

*Spot prices are $5 per ton higher
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron. Nominally 17 to 18c.	
Iron, basic or foundry, Swedish, aver. 65% iron. Nominally 15c.	
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	45c.
Man., African, Indian, 44-48%	40c.
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominally 40c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$17.00
Tungsten, domestic, scheelite delivered	$16.00 to $19.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$16.00
Rhodesian, 45%	22.00
Rhodesian, 48%	25.50
Turkish, 48-49%	25.00 to $26.00
Turkish, 45-46%	23.50 to 24.00
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	$25.50 to $26.50
48-49%	25.50 to 26.00

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00 to $19.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.75c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	4.75c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.50c.
Del'd Cleve'd, No. 4 industrial	5.25c.
Del'd Cleve'd, No. 5 industrial	3.25c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$4.00 to $4.25
Furnace, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	11.05
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports	14.75

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Sales are dragging in most sections, but foreign demand is sustaining factory output . . . $5,000,000 of Westinghouse's $12,000,000 appropriation will go for machinery.

Small Industrial Expansion Seen in Michigan

DETROIT—Outside the city there is a moderate amount of industrial expansion, chiefly by small new concerns which are getting ready for production of specialties. At Adrian, for instance, work has been resumed on construction of a plant for Magnesium Fabricators, Inc., which will have a $125,000 foundry. Construction of a powerhouse at Lansing is under way. Pontiac finally has seen operations begun by the Motherwell Mfg. Co., which is occupying a plant already equipped to forge about 60 tons of steel daily. Organization of the National Safety Marker Co., of Pontiac, also has been announced.

Westinghouse Program Center of Ohio Activity

CLEVELAND—The Westinghouse plant here has released several orders which had been held back for a number of months, and there has been some miscellaneous business, such as special milling equipment, placed recently after long delay. Otherwise, the domestic market continues spotty, with automobile purchasing very quiet except for occasional necessary replacements.

An inquiry is out for a 27-in. lathe with auxiliary equipment, and a 16-in. lathe, both for a local plant. The recently announced Westinghouse budget allocates $600,000 for improvements in facilities at Lima and other Ohio points.

Export Demand Sustaining Cincinnati Builders

CINCINNATI — The local machinery market rules spotty. While the estimated average demand the past week held to the previous week's level, the relative popularity of tool types changed. Lathes were most frequent on current ordering, with foreign demand most active. One contract for 20 small units was reported, while German interests closed for two crankshaft lathes. Milling machinery, heretofore most active, tends more quiet, but is still above the market average. Planer manufacturers indicate moderate demand, with a fair backlog which will keep operations at a fair rate for some time. As indicated, the demand is being sustained chiefly by export business.

Inquiry is at a fair rate and continues to bolster up potentialities against anticipated improvement.

Chicago Looks to Fall Recovery as Orders Lag

CHICAGO—Orders are being received at a very slow rate. No industrial lists of any consequence are out for bids, and the interest of the local sellers is now centered on the few tools desired by the Rock Island Arsenal. Sentiment still points to fall as the turning point. It is known definitely that there are several new tractor models being worked on by farm equipment plants in this territory for which no tool buying has yet been done. The lists of the Milwaukee and Santa Fe railroads have not yet been completed, and, although it is fairly definite that the remainder of these tools will be purchased, no one is exactly sure as to when these awards will be made.

May Volume Below April at Pittsburgh

PITTSBURGH—The total volume of machine tool business in May was not equivalent to that placed in April. Orders in the past week show no improvement, and inquiries have slackened off some. Most customers continue to await clarification of the general business situation before making commitments. According to Westinghouse officials, about $5,000,000 of the recently announced expansion program will be spent for equipment, including new machinery. Major items include replacement of equipment and purchase of machine tools at East Pittsburgh, South Philadelphia, Sharon, Pa., and East Springfield, Mass.

Orders Dwindled to Trickle At Month's End in N. Y.

NEW YORK — Although May seemed to show some promise a few weeks back, practically all sellers reported new orders at a minimum the past week. This situation applies to a dealer who booked substantial orders during the first half of May and to a factory representative who booked business in the first two weeks equal in dollar volume to 60 per cent of the entire month's sales in May, 1937. On the other hand, another seller reported the receipt of a few orders, after going several weeks without one. The immediate outlook is not too encouraging, except for business expected from the Army and Navy during the summer.

..CAST IRON PIPE..

Fall River, Mass., closes bids June 2 on cast iron pipe, hydrant parts, water meters, copper tubing and coils.

Public Water District No. 2, Pleasant Valley Subdivision, Clay County, Mo., care of Henrici-Lowry Engineering Co., West Tenth Street Building, Kansas City, Mo., consulting engineer, has called special election June 4 to determine boundaries of district where 12 miles of pipe lines are planned for water system. Another election will be held soon to vote bonds for $53,000 for project.

Newport News, Va., plans extensions in water pipe line to Fox Hill district. Cost about $75,800, a part of fund to be secured through Federal aid.

Parsippany, N. J., plans 6-in. pipe for water system in Lake Parsippany district. Cost about $31,400. Financing will be arranged through Federal aid. W. J. Burke is engineer.

Lorain, Ohio, plans extensions in water pipe line, including main line under Black River; also installation of a 1,500,000-gal. elevated steel tank and tower and new pumping equipment. Cost about $185,000. C. A. Pauly is chief engineer of water department.

Groesbeck, Tex., plans about 17,400 lin. ft. of 8-in. pipe for extensions in main water system; also 150,000-gal. elevated steel tank and tower, 600,000-gal. per day filtration plant and other waterworks installation. Bond issue of $80,000 has been voted and additional financing will be arranged through Federal grant. Howley, Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Altoona, Pa., plans extensions in water pipe lines and other waterworks installation. Cost about $500,000. Financing will be arranged through Federal aid. H. J. Baum is city engineer.

Archdale-Trinity Sanitary District, High Point, N. C., George B. Craven, chairman, plans about 50,000 ft. of 6-in. and 10,000 ft. of 2-in. pipe for water system, including meters and meter boxes, valves, hydrants, etc. Fund of about $171,000 will be arranged for this and sewer system in district, of which $95,000 will be represented by bond issue and remainder of fund through Federal aid. Geddie Strickland is engineer.

Latonah, Utah, plans about 12 miles of 1 to 4-in. for water system; also other waterworks installation. Financing will be arranged soon. S. G. Margetts, Felt Building, Salt Lake City, Utah, is consulting engineer.

Redding, Cal., opens bids June 15 on water system construction involving 104,570 ft. of 2, 6, 8 and 12-in. pipe.

United States Treasury Procurement Office, San Francisco, asks bids June 3 on 10,000 ft. of class 150 cement lined pipe.

East Bay Municipal Utility District, Oakland, Cal., has awarded 1500 tons of 4, 6, 10, 12, and 16-in. pipe to United States Pipe & Foundry Co., San Francisco, and 400 tons of 8-in. to American Cast Iron Pipe Co., San Francisco.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Johns-Manville Corp., 22 East Fortieth Street, New York, building and roofing products, insulating materials, etc., has let general contract to Consolidated Engineering Co., 20 East Franklin Street, Baltimore, for new mill for production of insulating board from wood pulp near Jarratt, Va., where about 140 acres recently were acquired. It will consist of one-story pulp mill, 240 x 240 ft., one-story dryer and manufacturing unit, 240 x 500 ft., one-story general manufacturing building, 240 x 520 ft., several smaller utility buildings, power house and shops. Cost close to $1,000,000 with equipment. Stone & Webster Engineering Corp., 49 Federal Street, Boston, is engineer.

New York City Omnibus Corp., 123 West 146th Street, has filed plans for one-story motor bus garage, service and repair building, 200 x 649 ft., at 721-39 Lenox Avenue, with frontages on West 146th and 147th Streets. Cost about $250,000 with shops and other facilities. Francis Seaman, 140 Cedar Street, is architect.

Manhattan Paste & Glue Co., Inc., 382 Second Avenue, New York, has acquired close to two acres at Kingland and Greenpoint Avenues, Brooklyn, improved with a five-story building, about 100,000 sq. ft. of floor space, and several one and two-story structures, 20,000 sq. ft. floor space, and will improve for plant. Present works at address noted and branch plant at Jersey City will be consolidated at new location and capacity increased.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until June 10 for 550 mast bases and 1800 mast sections (Circular 208); until June 15 for 5500 reels (Circular 214).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 14 for one motor-driven metal-cutting hacksaw (Schedule 3616), 120 hand cutting oxy-acetylene torches, and 276 welding oxy-acetylene torches (Schedule 3625); until June 16, electric cable, heat and flame resistant (Schedule 3635) for Brooklyn Navy Yard.

Kerite Insulated Wire & Cable Co., 30 Church Street, New York, has let general contract to H. Wales Lines Co., 134 State Street, Meriden, Conn., for two-story addition to main plant at Seymour, Conn., 55 x 130 ft. Cost over $50,000 with equipment.

United States Engineer Office, New York District, Army Building, New York, asks bids until June 9 for one new feeder cable with necessary metallic conduit, junction boxes, switches, leads and accessories (Circular 209).

Accurate Brass Co., Cooper and Wyckoff Avenues, Brooklyn, manufacturer of die castings, forgings and other brass products, has superstructure under way for new one-story plant, 80 x 160 ft., on site 100 x 220 ft., at Glendale, L. I. Cost about $45,000 with machinery.

Ordnance Officer, Second Corps Area, Governors Island, New York, asks bids until June 6 for motors, including fractional horsepower units (Circular 6).

Socony-Vacuum Oil Co., 26 Broadway, New York, has let general contract to Turner Construction Co., 420 Lexington Avenue, for two-story and basement addition, 46 x 120 ft., to branch technical plant at Paulsboro, N. J., and improvements in present building. Cost close to $100,000 with equipment. Frederick G. Frost, 144 East Thirtieth Street, New York, is architect.

Signal Property Officer, Signal Corps Laboratories, Fort Monmouth, Oceanport, N. J., asks bids until June 6 for 13,500 lin. ft. of portable cable (Circular 53); until June 7, copper concentric transmission line, junction boxes, terminals, etc. (Circular 54).

Architectural Steel Engineering Co., Inc., 1518 North Thirteenth Street, Philadelphia, manufacturer of steel specialties, has acquired a two-story building at 2101 East Venango Street for plant.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until June 6 for two motor-driven geared-head engine lathes, 14 x 30 in. (Circular 1046); until June 20, one or two primer manufacturing machines, caliber 0.50, complete unit (Circular 1036).

Atlantic Refining Co., 260 South Broad Street, Philadelphia, plans expansion and improvements in oil refineries on Passyunk Avenue, Philadelphia, and at Atreco, Tex., including equipment, tanks, etc. Company also will increase production in oil fields through acquisition of additional properties and installation of oil drilling equipment, bulk station facilities, pipe lines and other structures. A fund of $28,000,000 has been authorized for work noted, including additions to tanker fleet.

BUFFALO DISTRICT

Curtiss Aeroplane Division, Curtiss-Wright Corp., Vulcan and Kenmore Avenues, Buffalo, has asked bids on general contract for a one-story top addition to present two-story building at west end of main plant unit. Cost over $45,000.

Phoenix Brewery Corp., 300 Emslie Street, Buffalo, has filed plans for one-story addition, 65 x 105 ft., for expansion in mechanical-bottling division. Cost close to $40,000 with equipment. Julius C. Schultz & Son, 1370 Main Street, are architects.

City Council, Jamestown, N. Y., plans new municipal artificial gas plant. Cost close to $1,000,000. Financing will be arranged through Federal aid.

NEW ENGLAND

Draper Corp., Hopedale, Mass., manufacturer of textile machinery and parts, has let general contract to Bathelt Construction Co., 6 Newton Street, Holyoke, Mass., for two one-story additions, 30 x 520 ft., and 30 x 130 ft., respectively, for foundry and for storage and distribution, in order noted. Cost over $85,000 with equipment. John A. Stevens Co., Inc., Lowell, Mass., is engineer.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until June 13 for one dust collector (Circular 240), two two-spindle horizontal barrel drilling machines (Circular 254), three industrial model, propeller-type, portable electric cooling fans (Circular 235).

Colonial Beacon Oil Co., Inc., 378 Stuart Street, Boston, plans new bulk oil storage and distributing plant at Hallowell, Me., with steel tanks, service and garage unit for company motor trucks, pumping station and auxiliary structures. Cost close to $50,000 with equipment. Company is beginning work on similar plant at Portsmouth, N. H., for which general contract recently was let to Franklin Construction Co., Medford, Mass., to cost approximately a like amount.

WESTERN PA. DIST.

School District of Borough of Bellevue, 435 Lincoln Avenue, Bellevue, Pa., M. E. Brumbaugh, superintendent of schools, asks bids until June 6 for steel storage cabinets and lockers for three schools. Frederick Giffin, 38 South Fremont Avenue, is architect.

Monongahela West Penn Public Service Co., Fairmont, W. Va., plans extensions and improvements in power transmission and distributing lines at Clarksburg, W. Va., and vicinity. Cost about $100,000.

Ritchie-Wilmoth Coal Co., West Columbia, W. Va., plans new coal-loading wharf on Ohio River, including conveying, loading and other mechanical-handling facilities.

Baldwin Township Board of Education, 321 Clairton Road, Pittsburgh, plans manual training department in new multi-story junior and senior high school on Route 51. Cost about $300,000. Financing is being arranged through bond issue. J. Lawrence Hopp, 508 Third Avenue, Pittsburgh, is architect.

WASHINGTON DIST.

Quartermaster, Fort Hoyle, Md., asks bids until June 6 for one steam-operated boiler feed water pump, two centrifugal motor-driven boiler feed water pumps, one single automatic motor-driven return line vacuum heating pump (Circular 418-72).

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until June 11 for twist drills, levels and plumbs, trimmers' needles, steel oilers, combination pliers, center punches, steel wire cleaning brushes, tinners' shears and other tools (Circular 398-163).

Sherwood Distilling & Distributing Co., 212 East Lombard Street, Baltimore, has let general contract to G. Walter Tovell, Inc., Eutaw and Monument Streets, for six-story building at Westminster, Md., for storage and distribution. Cost over $80,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, will prepare plans soon for new power plant and auxiliary structures, cost about $500,000, and for power plant equipment and extensions in electric distributing system, to cost $2,250,000, in Fourteenth Naval District; also for new mooring facilities and accessory structures, cost $325,000, same district. Appropriation has been authorized.

General Purchasing Officer, Panama Canal, Washington, asks bids until June 10 for one motor-driven tool grinder, cast iron wheels for towing locomotives, 10,000 lb. of lead pipe, malleable iron galvanized pipe fittings, pipe flanges, gate and angle valves, ball cocks, rubber insulated cable, steel-wire brushes and other equipment (Schedule 3357).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 7 for two motor-driven universal hobbing machines, tools and equipment (Schedule 3585), one motor-driven geared-head precision tool room lathe (Schedule 3595) for Washington Navy Yard; files and rasps (Schedule 3582), axes, hammers, hatchets, sledges and other tools (Schedule 3559), wood boring bits, chisels and knives (Schedule 3584), terminal heaters, line type, and boosters (Schedule 3579); until June 10, seven portable power actuated swaging presses (Schedule 3581) for Eastern and Western yards.

SOUTH CENTRAL

Aircraft, Inc., 212 Union Street, Nashville, Tenn., airplanes and parts, has leased about 60 acres near Murfreesboro, Tenn., and will use part of tract for new plant. Initial unit will be one-story, 100 x 200 ft. Cost about $45,000 with equipment.

John G. Epping Bottling Works, Inc., 712 Logan Street, Louisville, has low bid from J. D. Jennings, 328 East Breckinridge Street, for one and two-story addition to mechanical-bottling plant, 30 x 125 ft. Cost over $60,000 with equipment. Carl J. Epping, 806 East Broadway, is architect.

Louisville Auto Spring Co., 905 South First Street, Louisville, manufacturer of steel automobile springs, etc., has leased one-story building, 100 x 125 ft., to be erected by B. C. Hagner, Louisville, at Eighth and Cawthorn Streets. Cost over $45,000 with equipment. Present works will be removed to new location and capacity increased. Walter C. Wagner, Breslin Building, is architect.

United States Engineer Office, Memphis, Tenn., asks bids until June 21 for 12 die-forged stud link chains, 12 steel wildcat cast-

...the new Greater Exide-Ironclad Battery

EXIDE now makes available to industry a series of Greater Exide-Ironclad Batteries, with abundant power to drive the largest electric material handling trucks continuously for twelve or more hours.

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ings to fit chains and patterns (Circular 289-F).

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until June 16 for auxiliary power and lighting switchboards for hydroelectric power plant at Guntersville, Ala.

SOUTHWEST

Johnston Tin Foil & Metal Co., 6106 South Broadway, St. Louis, has asked bids on general contract for one-story addition. Cost close to $45,000 with equipment.

City Council, Carrollton, Mo., plans new municipal electric light and power plant. Cost about $235,000 with equipment. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Board of Education, 911 Locust Street, St. Louis, plans manual training department in new three-story Banneker negro school at Ewing and Lucas Avenues, for which bids will be asked soon on general contract. Cost about $250,000. George W. Sanger, commissioner of school buildings, address noted, is in charge.

Kansas Electric Power Co., Lawrence, Kan., has let general contract to W. F. Edgell & Son, Leavenworth, Kan., for superstructure for new steam-electric power plant at Cameron Bluff, near Lawrence. Cost over $1,000,000 with equipment. Sargent & Lundy, Inc., 140 South Dearborn Street, Chicago, is consulting engineer.

United Gas Corp., Rusk Building, Houston, Tex., has acquired about five acres on Navigation Boulevard for new mechanical plant, including shops, equipment service buildings, and garage for company motor trucks. Cost about $65,000 with equipment.

Santa Rosa Growers, Inc., Santa Rosa, Tex., Floyd O. Kyte, Rio Grande National Life Building, Santa Rosa, head, plans one-story food products canning and packing plant. Cost close to $40,000 with equipment.

MICHIGAN DISTRICT

Murray Corp. of America, Inc., 7700 Russell Street, Detroit, steel automobile bodies, has let general contract to Esslinger-Misch Co., 159 East Columbia Street, for one-story addition to plant at Ecorse, Mich., for expansion in heavy steel stamping division. Cost about $50,000 with equipment. Giffels & Vallet, Inc., and L. Rossetti, Marquette Building, Detroit, are architects and engineers.

General Motors Corp., Detroit, will use plant of its Saginaw Steering Gear Division, Saginaw, Mich., for production of tools for manufacture of 1939 model automobile parts, and will concentrate such operations at that location, expanding facilities in tool-making department, instead of placing orders for required tools with outside companies as in past. Alva W. Phelps is plant manager at Saginaw.

State Department of Institutions, Lansing, Mich., will take bids soon on general contract for new power house at Newberry, Mich., to include two steam turbine units and accessories, three watertube boilers, feedwater heaters, pumping machinery, coal hoppers, coal elevator and auxiliary equipment. Cost about $230,000. Derrick Hubert, 1065 Sheridan Road, Menominee, Mich., is architect in charge.

Campbell Boat Co., Holland, Mich., plans one-story addition to boat-building and repair plant. Cost close to $30,000 with equipment.

SOUTH ATLANTIC

Rosa Co., Valdosta, Ga., manufacturer of naval stores, has plans for expansion for production of turpentine, rosin, etc., including new one-story units and equipment to double approximately present capacity. Cost over $40,000.

7-Up Bottling Co., 1655 North Miami Avenue, Miami, Fla., A. J. Tobin, president, will ask bids soon on general contract for one-story mechanical-bottling plant, 50 x 100 ft. Cost about $40,000 with equipment. George Bruce, Security Building, is architect.

Quartermaster, Fort Oglethorpe, Ga., asks bids until June 14 for galvanized roofing nails, copper wire cloth and hardware cloth (Circular 641-67).

OHIO AND INDIANA

Orville Simpson Co., 1230 Knowlton Street, Cincinnati, manufacturer of screening, sifting and other machinery and parts, has let general contract to Ferro Concrete Construction Co., Third and Elm Streets, for four-story addition, 62 x 66 ft. Cost about $75,000 with equipment. Samuel Hannaford & Son, Dixie Terminal Building, are architects.

Standard Brands, Inc., Widlar Products Department, 722 Bolivar Road, Cleveland, has let general contract to Hardy Brothers Construction Co., Texarkana, Tex., for one-story food products processing and packing plant at Texarkana, 80 x 560 ft. Cost close to $100,000 with equipment. Main offices of company are at New York.

Great Lakes Coca-Cola Bottling Co., 1235 Summit Street, Toledo, Ohio, has asked bids on general contract for one and two-story and basement mechanical-bottling plant, 150 x 160 ft. Cost close to $100,000 with machinery. Hewlett & Best, Richardson Building, are architects.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until June 6 for terminal and cable assemblies (Circular 1001); until June 7 for 40 gasoline flow meters (Circular 1006); until June 8, oil pump assemblies, motor-driven engine assemblies, engine-driven pump assemblies, and hydraulic pump assemblies (Circular 1016); until June 10, toggle switch shunts, potentiometer assemblies, filter cap gaskets, filter assembly screens, balance weights, screws, cell assemblies, indicator assemblies, etc. (Circular 1017), valve distributers and oil separators (Circular 1020); until June 14, 74 wheel and brake assemblies and 37 tail wheel assemblies (Circular 1002).

City Council, Garrett, Ind., plans extensions and improvements in municipal electric power plant, including new 500-hp. watertube boiler, automatic stoker, blast fan, high, and low-pressure piping and auxiliary equipment. Cost close to $45,000.

MIDDLE WEST

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until June 15 for induction coils, 200 to 400 generators, 200 to 400 capacitors, 500 to 1000 cranks, cords, ringers and other equipment (Circular 98).

Brede, Inc., 1940 N.E. Ulysses Street, Minneapolis, manufacturer of metal signs and displays, plans new two-story plant at Eighteenth Street and Stinson Boulevard. Cost about $100,000 with equipment. Financing is being arranged through RFC. D. J. C. Parsons, Foshay Tower Building, is architect.

Logan Engineering Co., 4541 North Ravenswood Avenue, Chicago, manufacturer of mining machinery and equipment, has let general contract to Smedberg & Nordell, 7937 Indiana Avenue, for new one-story plant, 90 x 160 ft., at 4726-44 North Lamon Avenue. Cost over $70,000 with equipment. Gregory Hodgkins, 3757 North Ashland Avenue, is architect.

Greeley Coca-Cola Bottling Co., Greeley, Colo., will ask bids soon on general contract for new two-story and basement mechanical-bottling plant, 50 x 105 ft. Cost about $45,000 with equipment. Sidney G. Frazier, Greeley National Bank Building, is architect.

City Council, Mount Pleasant, Iowa, plans extensions and improvements in municipal electric light and power plant, including new 1000-kw. turbo-generator unit and auxiliary equipment.

International Harvester Co., 180 North Michigan Avenue, Chicago, has asked bids on general contract for one-story factory branch, storage and distributing plant at Sixteenth and Pierce Streets, Omaha, Neb. Cost close to $80,000 with equipment.

District Quartermaster, Sparta CCC District, Sparta, Wis., asks bids until June 9 for rigid steel conduit, locknuts, bushings, connectors, reducers, washers, staples, conduit pipe straps, rubber-covered wire, lugs, screws, nuts and other equipment (Circular 7601-105).

PACIFIC COAST

Bureau of Yards and Docks, Navy Department, Washington, plans following improvements at Puget Sound Navy Yard, Bremerton, Wash.: New graving dock, cost about $4,500,000 with equipment; one-story foundry addition, cost $300,000 with equipment; extensions and alterations in shipbuilding dock, cost $100,000; extensions and improvements in power plant, cost about $450,000 with equipment, and additions and improvements in electrical distribution system, $300,000. Appropriation is being arranged in supplemental naval budget.

Western Pipe & Steel Co. of California, 444 Market Street, San Francisco, plans one-story addition to branch plant at Fresno, Cal. Cost close to $150,000 with equipment.

Bureau of Reclamation, Denver, asks bids until June 7 for line hardware and conductor fittings for switchyard of Southern California Edison Co., Los Angeles, at Boulder hydroelectric power plant, Boulder Canyon project (Specifications 1074-D).

B. W. Kuhn Co., 2310 East Washington Street, Los Angeles, contractor, plans early purchase of equipment for machine shop, including lathes, drill presses, forge shop equipment and other tools.

Shell Oil Co., Shell Building, San Francisco, plans new bulk oil storage and distributing plant at Leavenworth, Wash., where site is being acquired, including main building, pumping station, steel tanks and other facilities. Cost close to $50,000 with equipment. Company also plans improvements in bulk oil plant at Ephrata, Wash., to include steel tanks and other equipment. W. T. Shaw, Shell Oil Co., Chronicle Building, Spokane, Wash., is in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 10 for power-actuated portable tools (Schedule 3592) for Mare Island Navy Yard; until June 14, seamless steel tubing (Schedule 3600) for Puget Sound and Eastern yards; until June 17, one motor-driven universal tool and cutter grinder machine (Schedule 3603), one motor-driven vertical, duplex universal miller-shaper (Schedule 3602), one motor-driven, combination contour metal-sawing, filing and polishing machine (Schedule 3604) for San Diego Naval Air Station.

FOREIGN

Metropolitan Water, Sewerage and Drainage Board, Sydney, New South Wales, Australia, asks bids until June 28 for six motor-driven, horizontal-type centrifugal pumping units, direct-connected to motors, with starters and accessories (Contract No. 1619).

Phillips Blackburn Works, Ltd., London, England, manufacturer of electrical and radio equipment, has approved plans for construction of new one-story plant at Blackburn, Lancashire. Cost close to $500,000 with machinery.

Le Nickel Co., Ltd., Paris, manufacturer of nickel products, with mines in New Caledonia, plans expansion and improvements, including additional equipment. Company has arranged for increase in capital from 93,500 to 187,000 shares of stock, proceeds to total about $365,000, majority of fund to be used for purpose noted.

National Defense Ministry, Government of Mexico, Mexico, D.F., plans two new dry docks and ship repair plants for handling vessels up to 1200 tons rating. One of yards will be located on Island of Ulua, Vera Cruz harbor and site for other plant will be on Pacific Coast. Each yard will cost over $750,000 with construction and repair shops, and equipment.

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New INDUSTRIAL LITERATURE

CONTROL BOARD DESIGN.—Foxboro Co., Foxboro, Mass. A brief discussion of design and materials, followed by detailed information on standard sizes of instrument panel boards available, is contained in this 22-page bulletin. Panels are illustrated and suggested layouts for various applications are given.

HEAVY DUTY REFRACTORIES.—General Refractories Co., Philadelphia. Two-color booklet gives charts, test results and general information on heavy duty refractories. Photographs illustrate the manner in which these refractories stand up in service, as compared with fire brick.

COLD HEADER ATTACHMENT.—B-W Mfg. Co., 1128 Harper Avenue, Detroit. Booklet describes wire drawing attachment for cold headers that can be restocked in less than 60 sec. It is claimed that important savings may be realized through the fact that the machine can be fed rods in place of wire with this attachment.

WET DUST COLLECTORS.—C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland. Booklet describes the new Oil Froth wet dust collector which employs both oil and water in order to efficiently wet both carbonaceous and silica dusts. Line drawings show construction details and photographs illustrate many recent installations. Much practical data on the characteristics of air flow are included.

HEAT TREATED ALLOY STEELS.—Joseph T. Ryerson & Son, Inc., 16th and Rockwell Streets, Chicago. Folder describes Rycrome and Nikrome "M," two heat treated alloy steels for heavy duty applications carried in stock by the company. Tensiles of hot rolled Rycrome run up to 155,000 lb. per sq. in., with Brinells up to 321. Nikrome "M" hot rolled bars have tensiles around 125,000 lb. per sq. in. with Brinells around 265.

FOUNDRY CONVEYORS.—Chain Belt Co., 1600 West Bruce St., Milwaukee. "How to Handle It in the Foundry" is a booklet that illustrates equipment used in foundries for handling and conditioning sand, for handling molds and finished castings.

HYDRAULIC CRANK PIN GRINDER.—Landis Tool Co., 6th & Ringold Sts., Waynesboro, Pa. Catalog No. N-138 describes the new 10 in. hydraulic crank pin grinder designed principally for grinding small crankshaft pins. Close-ups show various construction features and complete specifications are listed.

MILLING MACHINES.—Brown & Sharpe Mfg. Co., 235 Promenade St., Providence, R. I. Standard types and dual control types of milling machines are covered in this booklet. Dual control machines have a complete set of hand adjustment and power fast travel controls at the rear of the table. Ingenious folding device shows the various features of the machine and photographs illustrate various attachments available.

ARC WELDERS.—General Electric Co., 1 River Road, Schenectady, N. Y. Bulletin GEA-144OF describes a single-operator welder possessing duplex control, is self-exciting and self stabilizing. Performance meets U. S. Navy specifications and the machine is available with either electric or gasoline engine drives.

CORROSION RESISTANT EQUIPMENT.—Haveg Corp., Newark, Del. Booklet describes corrosion resistant chemical equipment manufactured with Haveg, an acid resistant mixture of phenol-formaldehyde resins. Various pieces of equipment are shown and characteristics of Haveg are discussed.

STAINLESS AND DYESTUFFS.—American Rolling Mill Co., Middletown, Ohio. Under the title "Dyestuffs and Stainless are Friendly Enemies," this attractive booklet describes the use of Armco stainless steels in textile equipment. General recommendations of stainless for various dye solutions are listed and effect of stainless on colors is discussed.

WROUGHT STEEL PIPE. — Bethlehem Steel Co., Bethlehem, Pa. Catalog contains information on lap-welded pipe for gas and oil lines, and Ammonoduct, an ammonia pipe made of a special quality open-hearth steel. Ammonoduct is said to meet the need for pipe capable of withstanding the most severe requirements of cold forming or bending without developing embrittlement.

THE VALUE OF MACHINE TOOLS.—National Machine Tool Builders' Association, 10525 Carnegie Avenue, Cleveland. This booklet, entitled "Let Me Tell You About Machine Tools," is written by a machine operator, who tells in his own words what machine tools are, what they do, and something about the men who operate them.

ROLLER CHAINS.—Link-Belt Co., 307 N. Michigan Ave., Chicago. Catalog containing practical information, application pictures, engineering data on line of roller chain, and sprockets for drives and conveyors. Many new chains and features hitherto not publicly described are included.

MALLEABLE CASTINGS. — The Peoria Malleable Castings Co., Alexander & Averyole Sts., Peoria, Ill. Folder describing and illustrating certain types of malleable iron castings. Includes discussion of physical properties of malleable iron as compared with gray iron.

MATERIALS HANDLING.—R. G. LeTourneau, Inc., 220 Grant St., Peoria, Ill. Bulletin describing and illustrating new two wheel crane designed for jobs on which the side boom crane is unsuitable. Specifications and capacities with various length booms are included as well as a diagrammatic drawing of product.

CRUSHING.—American Pulverizer Co., 1249 Macklind Ave., St. Louis. "Rolling Ring" and swing hammers, crushers, grinders and shredders for the laboratory, are illustrated, and described in this 8-page bulletin.

HYDRAULIC VALVES.—Racine Tool & Machine Co., 1755 State St., Racine, Wis. The balanced piston type of hydraulic valve is described and illustrated in this four-page folder.

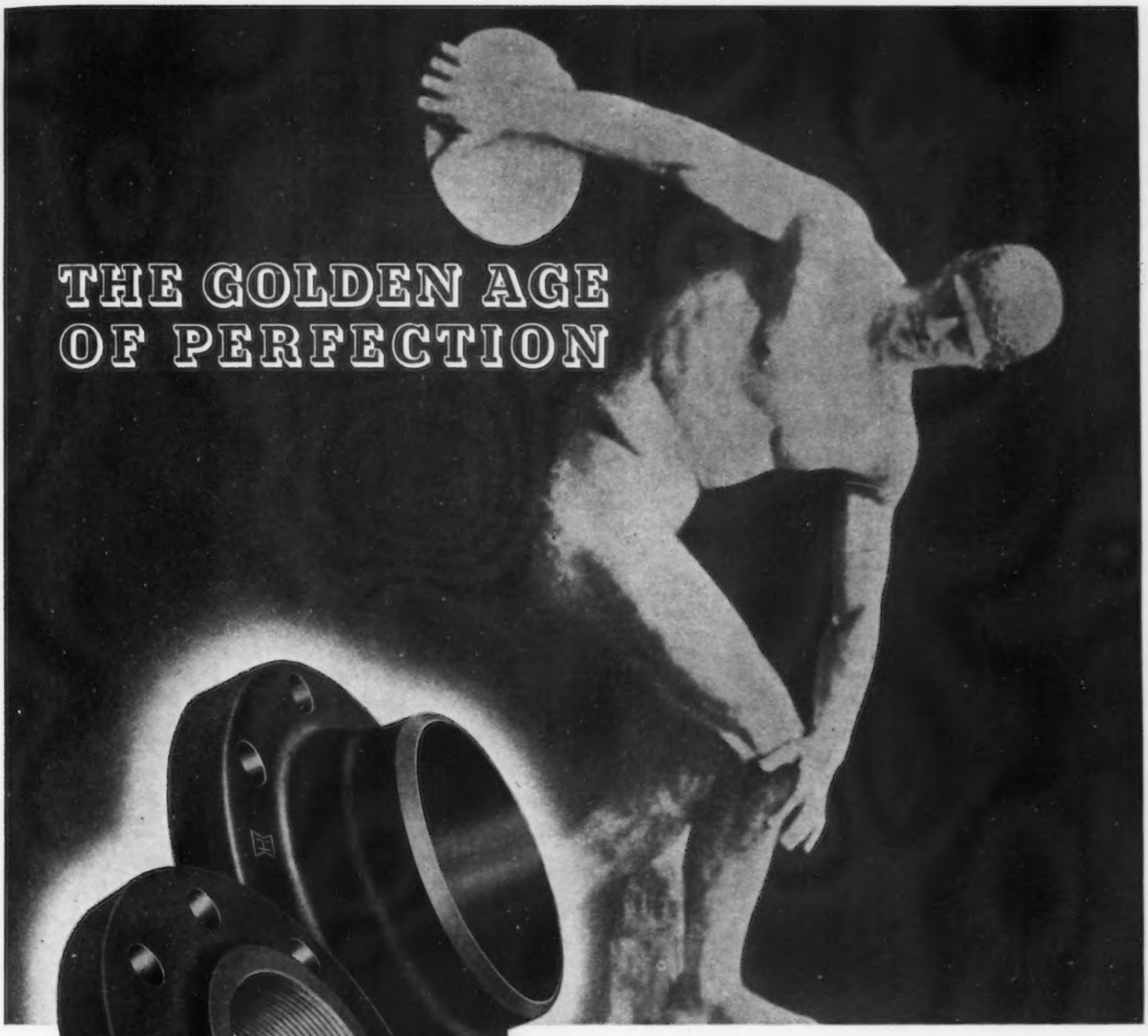
STELLITE CENTERS. — Scully-Jones & Co., 1901 S. Rockwell St., Chicago. Bulletin illustrating and giving various taper dimensions and list prices on the new redheat stellite center developed for use on high production machines.

HONING MACHINES.—Sunnen Products Co., 6741 Dale St., St. Louis. Folder describing precision honing machine with variable speed and automatic stone feed-up. Specifications and cutting speeds are included as is also a discussion of the Sunnen method of honing.

WELDING ELECTRODES.—Harnischfeger Corp., 4400 West National Ave., Milwaukee. 28-page catalog discussing Smootharc electrodes for many different applications. Several pages of technical data concerning welding are included as well as charts picturing and explaining spark tests of various types of steel.

BORING TOOLS. — Davis Boring Tool Division, the Larkin Packer Co., Inc., 6200 Maple Ave., St. Louis. Twenty-page catalog in which Davis expanding block type boring tool equipment is illustrated and described. Engineering data and several pages of specifications, dimensions and list prices of various types of boring tools are included.

Write for this literature on your company's letter-head. Please mention The Iron Age.



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Created at the pinnacle of Greek Civilization, Myron's sculpture, "The Discobolus" or Discus Thrower, is the paramount exemplification of art's "Golden Age of Perfection."

Ascendant, Greek Art attained eminence following the conquest of Darius, King of the Persians, at Marathon, 490 B.C. Myron's contemporaries, Polyclitus and Phidias stand with him, supreme. The world has not produced an approach to the beauty of their concept, the genius of their hands.

To establish and maintain an unquestioned leadership in industrial steel products is Harrisburg's achievement. Combining the skill of the modern designer with steel of special fitness for the job in hand, Harrisburg offers to industry a perfection of utility that spells quality and endurance; therefore, economy. Industry's varying problems find here analytical approach to practical solution.

Illustration of "The Discobolus" is reproduced from "Famous Statues and Their Stories" by Edwin Rayner, courtesy Grosset & Dunlap, publishers.

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ALLOY AND CARBON STEELS · DROP AND HOLLOW FORGINGS · PIPE FLANGES, COUPLINGS, BULL PLUGS · PUMP LINERS · CYLINDERS · COILS, BENDS

JUST BETWEEN US TWO

One Of Our Girls Made It . . .

ONLY once in the long history of your favorite family journal has a woman won the post of associate editor, and here she is, leveling a Mona Lisa look at someone offstage.

Name: G. Ricciardi, B.S., Hunter College.

Job: Right-hand man to John H. Van Deventer, editor-in-chief.

A great number of the 4000 or so editorial pages that meet your eye here each year have paraded before her critical eyes and been purged of their errors—although there was that time she let her chief move Faneuil Hall from Boston to Philadelphia.

Distinguishing characteristic: An uncontrollable and uncomfortable yen for work. The hardest toiler in the editorial vineyard, she is also among the most astute—and you can skip the "among." Our paragon is no clockwatcher. She gets in late regularly.

But life has its lighter side for Gemma (meaning "bud"). She bought herself a farm somewhere in New York State, where she relaxes week-ends by driving a tractor and building stone walls. Just where the farm is she doesn't say, despite broad hints that it would be a good place to hold THE IRON AGE annual chowder and beer party on June 25—Founder's Day—John Williams' birthday—God rest his soul.

She speaks six languages fluently and is quiet in all of them.

Side Order of Hash

EVERY year without fail we get an anonymous message from someone in Wrightsville, Pa. It is never signed and comes to us on a long sheet of a peculiar kind of thin, oiled paper, on which disconnected words and phrases are written at different angles. The latest reads:

> *Religion versus commercial—dragons blood—sanguinous draconis—post office inspectors—three reasons—trespassing—handwriting on wall—when the moon comes over the mountain—right property—magpie—right dowry—astrologers.*

Sounds like S. S. Van Dine, Jim Farley and Kate Smith coming out of the ether all at once.

Stopper

WORKS Manager . . . Age 36—looks 50—feels 100! *United States Steel.*

Four Gone and One to Go

WE had an idea that if you made an error in Russia the safest thing to do was to sit tight and hope no one noticed it. But we were wrong. The Young Pioneers of the U.S.S.R. get out a publication in English called *"U.S.S.R. in Construction."* The copy we saw had a slip inserted reading:

> *"If any defects are discovered in this issue, it will be much appreciated if the copy is returned."*

This example of publishing bravery arouses our admiration, for although the year isn't yet even half over, this column alone has rolled up the handsome total of four typographical errors—just one short of our quota of one a month. If we followed the Young Pioneers' lead, back would come copies from our eighteen loyal readers—or, Lord forbid, maybe none would come back.

She Guards the Status Quo

THE foreign news these days makes us shudder, for it portends more trouble with Miss McSorley, who keeps the subscription cards in order.

With readers all over the globe, we have a special celluloid separation card for each country. The elimination of a nation, the creation of a new one, or even the change in a national border, disturbs Mac no end.

She has an idea that nations are eternal, and a change in a separation card is as alarming to her as a "for sale" sign on a church. She was harder than the League of Nations to convince that it was all right to make out a card for Manchukuo. She still regards the card suspiciously and continues to ask what country Manchukuo is in. When we explain that it is a nation by itself, she just says "Hm."

We hope things quiet down.

—A.H.D.

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